V.42.

Library
of the
Academy of Medicine
Toronto.
15752

Presented by

Dr. Alexander Primrose
1924

The Transactions

of the

Edinburgh Obstetrical Society

PRINTED BY
OLIVER AND BOYD
EDINBURGH, SCOTLAND

The Transactions

of the

Edinburgh Obstetrical Society

Session 1921-1922

VOLUME XLII

LIBRARY
DEC 1 9 2002
UNIVERSITY OF TORONTO

Edinburgh
Oliver and Boyd, Tweeddale Court
Publishers to the Society
1922

PREFACE

THE present is the first volume of Transactions issued under the new arrangements rendered necessary by the increased cost of publication.

A special appeal is made for the loyal support and co-operation of all Fellows of the Society during the present period of financial anxiety.

The Treasurer will be grateful for notices of changes of address, deaths, or any other information necessary to keep the lists up to date.

The views expressed in this volume are to be taken as the opinions of the Fellows concerned; they do not necessarily reflect the opinion of the Society as a whole.

THE EDITOR.

54 NORTHUMBERLAND STREET,
EDINBURGH, 24*th October* 1922.

Edinburgh Obstetrical Society

Office-Bearers for Session 1921-1922

President

JAMES LAMOND LACKIE, M.D., F.R.C.P.Ed.

Vice-Presidents

JAMES HAIG FERGUSON, M.D., F.R.C.P.Ed., M.R.C.S.Eng., F.R.C.S.Ed.
WILLIAM FORDYCE, M.D., F.R.C.P.Ed.

Treasurer

WILLIAM MACRAE TAYLOR, M.B., F.R.C.S.Ed., 8 Melville Street.

Secretaries

H. S. DAVIDSON, O.B.E., M.B., F.R.C.S.Ed., 52 Melville Street.
JAMES YOUNG, D.S.O., M.D., F.R.C.S.Ed., 29 Manor Place.

Librarian

R. W. JOHNSTONE, C.B.E., M.D., F.R.C.S.Ed., M.R.C.P.Ed.,
10 Alva Street.

Editor of Transactions

FRANCIS J. BROWNE, M.D., F.R.C.S.Ed., 54 Northumberland Street.

Members of Council

DAVID ROBERTSON DOBIE, M.D., C.M.
ROBERT ROBERTSON, M.B., C.M.
ANDREW BINNY FLETT, M.B., Ch.B.
NATHANIEL T. BREWIS, M.B., F.R.C.S.Ed.
ROBERT STEWART, M.B., C.M.
H. S. LANGWILL, M.D., F.R.C.P.Ed.
JOHN CRAIG, M.B., Ch.B.
A. GRAHAM RITCHIE, M.B., F.R.C.P.Ed.

List of Presidents, Vice-Presidents, Treasurers, Secretaries, and Librarians

PRESIDENTS.

	Year.		Year.
Dr William Beilby,	1840–41	Dr C. E. Underhill,	1888–89
Sir James Y. Simpson, Bart.,	1842–57	Dr D. Berry Hart,	1890–91
Dr John Moir,	1858–59	Sir A. R. Simpson,	1892–93
Dr Alex. Keiller,	1860–61	Dr A. H. Freeland Barbour,	1894–95
Dr T. H. Pattison,	1862–63	Dr Alexander Ballantyne,	1896–97
Dr T. Graham Weir,	1864–65	Sir J. Halliday Croom,	1898–99
Sir James Y. Simpson, Bart.,	1866–67	Dr R. Milne Murray,	1900–01
Dr John Burn,	1868–69	Dr James Ritchie,	1902–03
Dr Charles Bell,	1870–71	Dr N. T. Brewis,	1904–05
Dr L. R. Thomson,	1872–73	Dr J. W. Ballantyne,	1906–07
Dr Matthews Duncan,	1874–75	Prof. W. Stephenson,	1908–09
Sir A. R. Simpson,	1876–77	Dr F. W. N. Haultain,	1910–11
Dr David Wilson,	1878–79	Dr Haig Ferguson,	1912–13
Dr Angus Macdonald,	1880–81	Sir J. Halliday Croom,	1914–19
Sir A. R. Simpson,	1882–83	Dr William Fordyce,	1920–21
Dr John Connel,	1884–85	Dr James Lamond Lackie	1922
Sir J. Halliday Croom,	1886–87		

VICE-PRESIDENTS.

	Year.		Year.
Sir J. Y. Simpson, Bart.,	1840–41	Dr Charles Bell,	1866–67
Dr Alex. Ziegler,	1840–41	Dr William Bryce,	1868–69
Dr J. Cowan, R.N.,	1842	Dr J. A. Sidey,	1868–69
Dr Fairbairn,	1842	Dr William Menzies,	1870–71
Dr Charles Ransford,	1843	Dr L. R. Thomson,	1870–71
Dr R. B. Malcolm,	1843	Sir A. R. Simpson,	1872–73
Dr Charles Bell,	1844	Dr J. Matthews Duncan,	1872–73
John Kennedy, Esq.,	1844	Dr Angus Macdonald,	1874–75
Dr John Moir,	1845–47	Dr R. Peel Ritchie,	1874–75
Dr T. H. Pattison,	1845–47	Dr James Young,	1876–77
Dr Beilby,	1848	Dr Alex. Milne,	1876–77
Dr T. Graham Weir,	1848	Dr R. Peel Ritchie,	1878–79
Dr R. B. Malcolm,	1849–53	Dr Angus Macdonald,	1878–79
Dr John Moir,	1849–53	Sir A. R. Simpson,	1880–81
Dr T. Graham Weir,	1854–55	Dr Robert Bruce,	1880–81
Dr John Moir,	1854–55	Dr James Carmichael,	1882–83
Dr W. Cumming,	1856–57	Sir J. Halliday Croom,	1882–83
Dr A. Thomson,	1856–57	Dr Angus Macdonald,	1884
Dr T. H. Pattison,	1858–59	Dr Charles E. Underhill,	1884–85
Dr David Wilson,	1858–59	Dr William Ziegler,	1885
Dr T. Graham Weir,	1860–61	Sir A. R. Simpson,	1886–87
Dr George S. Keith,	1860–61	Dr Leith Napier,	1886
Dr T. Graham Weir,	1862–63	Dr D. Berry Hart,	1887–88
Dr Alex. Keiller,	1862–63	Dr James Foulis,	1888–89
Dr T. H. Pattison,	1864–65	Dr A. J. Sinclair,	1889
W. S. Carmichael, Esq.,	1864–65	Sir A. R. Simpson,	1890
Dr John Burn,	1866–67	Dr Peter A. Young,	1890–91

Edinburgh Obstetrical Society

Office-Bearers for Session 1921-1922

President

JAMES LAMOND LACKIE, M.D., F.R.C.P.Ed.

Vice-Presidents

JAMES HAIG FERGUSON, M.D., F.R.C.P.Ed., M.R.C.S.Eng., F.R.C.S.Ed.
WILLIAM FORDYCE, M.D., F.R.C.P.Ed.

Treasurer

WILLIAM MACRAE TAYLOR, M.B., F.R.C.S.Ed., 8 Melville Street.

Secretaries

H. S. DAVIDSON, O.B.E., M.B., F.R.C.S.Ed., 52 Melville Street.
JAMES YOUNG, D.S.O., M.D., F.R.C.S.Ed., 29 Manor Place.

Librarian

R. W. JOHNSTONE, C.B.E., M.D., F.R.C.S.Ed., M.R.C.P.Ed.,
10 Alva Street.

Editor of Transactions

FRANCIS J. BROWNE, M.D., F.R.C.S.Ed., 54 Northumberland Street.

Members of Council

DAVID ROBERTSON DOBIE, M.D., C.M.
ROBERT ROBERTSON, M.B., C.M.
ANDREW BINNY FLETT, M.B., Ch.B.
NATHANIEL T. BREWIS, M.B., F.R.C.S.Ed.
ROBERT STEWART, M.B., C.M.
H. S. LANGWILL, M.D., F.R.C.P.Ed.
JOHN CRAIG, M.B., Ch.B.
A. GRAHAM RITCHIE, M.B., F.R.C.P.Ed.

List of Presidents, Vice-Presidents, Treasurers, Secretaries, and Librarians

PRESIDENTS.

	Year.		Year.
Dr William Beilby,	1840–41	Dr C. E. Underhill,	1888–89
Sir James Y. Simpson, Bart.,	1842–57	Dr D. Berry Hart,	1890–91
Dr John Moir,	1858–59	Sir A. R. Simpson,	1892–93
Dr Alex. Keiller,	1860–61	Dr A. H. Freeland Barbour,	1894–95
Dr T. H. Pattison,	1862–63	Dr Alexander Ballantyne,	1896–97
Dr T. Graham Weir,	1864–65	Sir J. Halliday Croom,	1898–99
Sir James Y. Simpson, Bart.,	1866–67	Dr R. Milne Murray,	1900–01
Dr John Burn,	1868–69	Dr James Ritchie,	1902–03
Dr Charles Bell,	1870–71	Dr N. T. Brewis,	1904–05
Dr L. R. Thomson,	1872–73	Dr J. W. Ballantyne,	1906–07
Dr Matthews Duncan,	1874–75	Prof. W. Stephenson,	1908–09
Sir A. R. Simpson,	1876–77	Dr F. W. N. Haultain,	1910–11
Dr David Wilson,	1878–79	Dr Haig Ferguson,	1912–13
Dr Angus Macdonald,	1880–81	Sir J. Halliday Croom,	1914–19
Sir A. R. Simpson,	1882–83	Dr William Fordyce,	1920–21
Dr John Connel,	1884–85	Dr James Lamond Lackie	1922
Sir J. Halliday Croom,	1886–87		

VICE-PRESIDENTS.

	Year.		Year.
Sir J. Y. Simpson, Bart.,	1840–41	Dr Charles Bell,	1866–67
Dr Alex. Ziegler,	1840–41	Dr William Bryce,	1868–69
Dr J. Cowan, R.N.,	1842	Dr J. A. Sidey,	1868–69
Dr Fairbairn,	1842	Dr William Menzies,	1870–71
Dr Charles Ransford,	1843	Dr L. R. Thomson,	1870–71
Dr R. B. Malcolm,	1843	Sir A. R. Simpson,	1872–73
Dr Charles Bell,	1844	Dr J. Matthews Duncan,	1872–73
John Kennedy, Esq.,	1844	Dr Angus Macdonald,	1874–75
Dr John Moir,	1845–47	Dr R. Peel Ritchie,	1874–75
Dr T. H. Pattison,	1845–47	Dr James Young,	1876–77
Dr Beilby,	1848	Dr Alex. Milne,	1876–77
Dr T. Graham Weir,	1848	Dr R. Peel Ritchie,	1878–79
Dr R. B. Malcolm,	1849–53	Dr Angus Macdonald,	1878–79
Dr John Moir,	1849–53	Sir A. R. Simpson,	1880–81
Dr T. Graham Weir,	1854–55	Dr Robert Bruce,	1880–81
Dr John Moir,	1854–55	Dr James Carmichael,	1882–83
Dr W. Cumming,	1856–57	Sir J. Halliday Croom,	1882–83
Dr A. Thomson,	1856–57	Dr Angus Macdonald,	1884
Dr T. H. Pattison,	1858–59	Dr Charles E. Underhill,	1884–85
Dr David Wilson,	1858–59	Dr William Ziegler,	1885
Dr T. Graham Weir,	1860–61	Sir A. R. Simpson,	1886–87
Dr George S. Keith,	1860–61	Dr Leith Napier,	1886
Dr T. Graham Weir,	1862–63	Dr D. Berry Hart,	1887–88
Dr Alex. Keiller,	1862–63	Dr James Foulis,	1888–89
Dr T. H. Pattison,	1864–65	Dr A. J. Sinclair,	1889
W. S. Carmichael, Esq.,	1864–65	Sir A. R. Simpson,	1890
Dr John Burn,	1866–67	Dr Peter A. Young,	1890–91

List of Office-Bearers

	Year.		Year.
Dr John Playfair,	1891–92	Sir J. Halliday Croom,	1905–1906
Dr Freeland Barbour,	1892–93	Dr D. Berry Hart,	1906–1907
Dr A. Ballantyne,	1893–94	Dr William Fordyce,	1907–1908
Dr James Ritchie,	1894–95	Dr F. W. N. Haultain,	1908–1909
Sir J. Halliday Croom,	1895–96	Dr Freeland Barbour,	1909–1910
Sir A. R. Simpson,	1896–97	Dr Lamond Lackie,	1910–1911
Dr R. Milne Murray,	1897–98	Dr N. T. Brewis,	1911–1912
Dr N. T. Brewis,	1898–99	Dr J. W. Ballantyne,	1912–1913
Dr J. W. Ballantyne,	1899–1900	Dr G. F. Barbour Simpson,	1913–1919
Dr Samuel Macvie,	1900–1901	Dr George Keppie Paterson,	1913–1919
Dr F. W. N. Haultain,	1901–1902	Dr Angus Macdonald,	1919–1920
Dr J. Haig Ferguson,	1902–1903	Dr Robert Jardine	1919–1921
Sir A. R. Simpson,	1903–1904	Dr Haig Ferguson	1920–1922
Professor J. A. C. Kynoch,	1904–1905	Dr William Fordyce	1921

TREASURERS.*

	Year.		Year.
Dr Ransford,	1840 to 1842	Dr James Young,	1867 to 1875
Dr G. Paterson,	1842 to 1847	Dr William Craig,	1875 to 1910
Dr Cumming,	1847 to 1854	Dr Barbour Simpson,	1910 to 1912
Dr Keiller,	1854 to 1859	Dr John McGibbon,	1912 to 1921
Dr J. A. Sidey,	1859 to 1867	Dr W. Macrae Taylor,	1921

SECRETARIES.

	Year.		Year.
Dr Ransford,	1840 to 1842	Dr D. Berry Hart,	1879 to 1883
Dr G. Paterson,	1840 to 1847	Dr A. H. Freeland Barbour,	1881 to 1886
Dr Dunsmure,	1842 to 1847	Dr R. Milne Murray,	1883 to 1889
Dr Cumming,	1847 to 1854	Dr N. T. Brewis,	1886 to 1893
Dr Keith,	1847 to 1849	Dr J. W. Ballantyne,	1889 to 1896
Dr J. M. Duncan,	1849 to 1852	Dr F. W. N. Haultain,	1893 to 1897
Dr Keiller,	1852 to 1859	Dr J. Haig Ferguson,	1896 to 1901
Dr J. A. Sidey,	1854 to 1861	Dr William Fordyce,	1897 to 1904
Dr A. R. Simpson,	1859 to 1865	Dr Lamond Lackie,	1901 to 1907
Dr Peter Young,	1861 to 1863	Dr Barbour Simpson,	1904 to 1909
Dr W. Stephenson,	1863 to 1867	Dr Angus Macdonald,	1907 to 1913
Dr R. Peel Ritchie,	1865 to 1873	Dr B. P. Watson,	1909 to 1912
Dr G. Stevenson Smith,	1867 to 1871	Dr E. Scott Carmichael,	1912 to 1915
Dr James Andrew,	1871 to 1875	Dr R. W. Johnstone,	1913 to 1921
Dr Alexander Milne,	1873 to 1875	Dr H. S. Davidson,	1920
Dr C. E. Underhill,	1875 to 1879	Dr James Young	1921
Dr James Carmichael,	1875 to 1881		

LIBRARIANS.

	Year.		Year.
Dr J. Jamieson,	1875 to 1879	Dr F. W. N. Haultain,	1899 to 1909
Dr C. E. Underhill,	1879 to 1883	Dr Lamond Lackie,	1909 to 1921
Dr Peter Young,	1883 to 1889	Dr R. W. Johnstone	1921
Dr R. Milne Murray,	1889 to 1899		

EDITORS OF TRANSACTIONS.

	Year.		Year.
Dr J. W. Ballantyne,	1896 to 1899	Dr W. Macrae Taylor,	1907 to 1910
Dr N. T. Brewis,	1899 to 1901	Dr Oliphant Nicholson,	1910 to 1912
Dr J. Lamond Lackie,	1901 to 1905	Dr James Young,	1912 to 1921
Dr Angus Macdonald,	1905 to 1907	Dr F. J. Browne	1921

* Previous to 1861 the office of Treasurer was conjoined with that of Senior Secretary.

List of Fellows of the Society

HONORARY FELLOWS.

1901 Bar, Prof. Paul, M.D., Rue la Boëtie, 122, Paris.
1906 Bossi, Professor L. M., The University, Genoa.
1915 Briggs, Professor Henry, M.B., F.R.C.S., 3 Rodney Street, Liverpool.
1921 Brindeau, Dr A., Paris.
1911 Bumm, Professor, Berlin.
1913 Champneys, Sir Francis H., Bart., London.
1898 Coe, Prof. Henry C., M.D., 27 East Sixty-fourth St., New York.
1921 Croom, Emeritus-Professor Sir J. Halliday, Edinburgh.
1915 Cullen, Thomas S., M.B., F.A.C.S., The Johns Hopkins University, Baltimore, U.S.A.
1910 Döderlein, Professor Albert Sigmund Gustav, Munich.
1913 Edgar, Prof. James C., New York.
1913 Fabre, Professor Jean, Lyon.
1900 Fehling, Professor Herman, M.D., Gungenbach Strasse, 4, Baden-Baden.
1915 Jacobi, Professor, Brussels.
1898 Kelly, Prof. Howard A., M.D., Johns Hopkins Hospital, Baltimore, U.S.A.
1907 Kinoshita, Dr Seichu, Professor of Obstetrics and Gynæcology, Imperial University, Tokio, Japan.
1906 Makiěyeff, Prof. Alexander Matvějěvic, The University, Moscow.
1895 Martin, Emeritus-Professor Dr A., Freiherr von Stein Strasse, 2, Berlin, W.
1903 Morisani, Professor O., San Felice à Piazza Dante, 10, Naples.
1913 Nagel, Professor Wilhelm, Potsdamer Strasse, 96, Berlin, W. 57.
1901 Ott, Professor D. von, M.D., Professor of Obstetrics, University of St Petersburg.
1902 Pestalozza, Professor, Instituts Obstetrico Policlinico, Roma.
1921 Phillips, Sir John, London.
1895 Pinard, Professor A., Rue Cambacérès, 10, Paris.
1921 Reid, Dr W. L., Glasgow.
1921 Routh, Dr Amand J., London.
1921 Smyly, Sir Wm. J., Dublin.
1901 Sneguireff, Professor W., University of Moscow.
1921 Spencer, Prof. Herbert, London.
1897 Williams, Sir John, Bart., G.C.V.O., M.D., LL.D., Plas Llanstephan, Carmarthenshire.
1912 Williams, Professor J. Whitridge, Johns Hopkins University, Baltimore.
1905 Zweifel, Professor, Frauenklinik University, Leipzig.

CORRESPONDING FELLOWS.

1884 Arnott, Brig. Surg.-Lieut.-Col. Jas., 8 Rothesay Place.
1887 Baumgartner, Dr H. S., Newcastle-on-Tyne.
1880 Bosch, Dr Van Den, Liège.
1894 Curatulo, Prof. G. E., Rome.
1873 Donovan, Mr W., Birmingham.
1896 Eyres, Hugh Middleton, Richmond.
1864 Finlay, Right Hon. Viscount, G.C.M.G., M.D., LL.D., K.C., London.
1892 Fraser, Dr Hugh E., Dundee.
1879 Glaister, Prof., Glasgow.
1877 Grassett, Dr F., Toronto.
1875 Groesbeck, Dr Hermann J., New York.
1897 Günsberg, Charkow, Russia.
1880 Helme, Dr J. M., Carnforth.
1893 Howard-Jones, Dr J., Newport.
1881 Hurst, Dr George, Australia.
1882 Husband, Dr H. Aubrey, Jamaica.
1893 Hutchison, Dr Robert, London.
1894 Jennings, Dr David D., New York.
1874 Kleinwächter, Prof. L., Grätz.
1871 Lambert, Dr, Paris.
1878 Macdougall, Dr John A., The Hill, Balerno, Midlothian.
1879 Machattie, Dr Thomas A., Bathurst, N.S.W., Australia.
1870 M'Kendrick, Professor, Stonehaven.

1883 Mills, Dr B. Langley, India.
1897 Minchin, Dr, Charkow, Russia.
1877 Moolman, Dr Henry, South Africa.
1884 Neve, Dr E. F., Kashmir, India.
1885 Puckle, Dr S. Hale, Church Stoke, Mont.
1878 Serdukoff, Dr A., St Petersburg.
1887 Shiels, Dr G. F., San Francisco.
1888 Stevenson, Sir Edmond Sinclair, Cape Town, South Africa.
1875 Sutugin, Dr V., St Petersburg.
1880 Turner, Dr William, O.B.E., M.V.O.
1885 Underhill, Dr F. T., Vancouver.
1886 Whitton, Dr A. B., Turiff, Aberdeenshire.

ORDINARY FELLOWS.

(*a.*) LIFE MEMBERS.

		Date of Admission.
	Aarons, Dr S. Jervois, 6 Harley Street, London, W. 1,	1896
	Adam, Dr George Rothwell, 84 Collins Street, Melbourne, Australia,	1879
	Anderson, Dr John, An Laimhrig, Pitlochry,	1896
	Ballantyne, Dr Harold S., Ashton, Eskbank, Dalkeith,	1897
5	Ballantyne, Dr J. W., 19 Rothesay Terrace,	1883
	Barbour, Dr A. H. Freeland, 4 Charlotte Square,	1879
	Barclay, Dr William John, Invercargill, New Zealand,	1899
	Barrington, Dr Fourness, 213 Macquarrie Street, Sydney, Australia	1884
	Brock, Dr G. Sandison, M.B.E., 6 Corso d'Italia, Rome,	1894
10	Burton, Dr Arthur, Stenson, Cromer,	1912
	Chipman, Dr W. W., 285 Mountain St., Montreal, Canada,	1895
	Craig, Dr John, 110 Morningside Road,	1900
	Croom, Dr David Halliday, 17 Alva St.,	1903
	Croom, Prof. Sir John Halliday, 8 Morningside Place,	1870
15	Crow, Dr W. J., 13 Merchiston Place,	1909
	Cumming, Dr John, 1 Strathearn Place,	1896
	Davidson, Dr Hugh, 52 Melville Street,	1904
	Dumat, Dr Henry Aylmer, 7 Devonshire Place, Durban, Natal, South Africa,	1898
	Ferguson, Dr J. Haig, 7 Coates Crescent,	1885
20	Fitzwilliams, Dr Gerald Lloyd, Alexandra Buildings, Hong Kong, China,	1907
	Fleming, Dr Andrew M., C.M.G., Salisbury, Rhodesia,	1904
	Fowler, Dr Simson, Waverley, Juniper Green,	1892
	Gibson, Dr R. Wilson, Town Head House, Orton, Westmoreland,	1903
	Grant, Dr Lewis, Neston, Cheshire,	1896
25	Houghton, Dr C. Hobart, Fort Hare, Alice, Cape Colony, South Africa,	1907
	Hutchison, Dr Alex., Stonefield, Grantown-on-Spey,	1913
	Inch, Dr Robert, Gorebridge,	1887
	Johns, Dr W. Wilton, Ramleh, Nairn,	1912
	Johnstone, Dr R. W., C.B.E., 10 Alva Street,	1903
30	Kanga, Dr K. B., Dr Nazareth's Hospital, Karachi, India,	1912
	Kerr, Dr F. K., M.C., 168 Newhaven Road, Leith,	1912
	Lackie, Dr James Lamond, 7 Randolph Crescent,	1889
	Livingston, Dr George R., 47 Castle Street, Dumfries,	1898
	M'Arthur, Dr W. Taylor, 2025 Western Avenue, Los Angeles, California,	1901
35	M'Brearty, Dr J. Wilson, Greymouth, West Coast, New Zealand,	1899
	M'Culloch, Dr John, Lindsay, Ontario, Canada,	1909

List of Fellows

		Date of Admission.
	M'Gibbon, Professor John, P.O. Box 1176, The University, Johannesburg, South Africa,	1902
	M'Master, Dr A. C., 7 Moultrie Road, Rugby,	1906
	Macnab, Dr James C. G., Johannesburg, Transvaal, South Africa	1904
40	Maddox, Dr Ralph H., I.M.S., C.I.E., c/o Messrs Thomas Cook & Son, Ludgate Circus, London, E.C.,	1887
	Martin, Dr Christopher, Cleveland House, George Road, Edgbaston, Birmingham,	1888
	Melville, Dr George, The Eyrie, Penicuik,	1912
	Melville, Dr Kenmure, 2 Churchhill,	1900
	Morgan, Dr T. H., Wickham Terrace, Brisbane, Queensland, Australia,	1895
45	Mules, Dr P. Henry, Woodville, Wellington, New Zealand,	1903
	Nicholson, Dr H. Oliphant, 20 Manor Place,	1900
	Pitts, Dr Edith Cochrane-Brown, c/o Mr Thos. Brown, Meribali, Christchurch, New Zealand,	1905
	Ritchie, Dr A. G., 5 Walker Street,	1912
	Ronaldson, Dr J. Bruce, Penn Road, Beaconsfield, Bucks,	1911
50	Ross, Dr James F. W., 481 Sherbourne Street, Toronto, Canada,	1889
	Russell, Dr J. Lawson, 20 Liverpool Road, Chester,	1906
	Sabawala, Dr Behram Pestonjee, c/o Messrs King, King & Co., Hornby Road, Bombay, India,	1912
	Simpson, Dr G. F. Barbour, 43 Manor Place,	1898
	Simpson, Dr W. Petrie, Viewbank, Bathgate,	1892
55	Simson, Dr H. J. F., 36 Grosvenor Street, London, W.,	1897
	Sloss, Dr William, 706 Sturt Street, Ballarat, Victoria, Australia,	1902
	Stewart, Dr J. D. Grahame, c/o Menzies, Bruce, Low & Thomson, W.S., 23 York Place, Edinburgh	1913
	Taylor, Dr James A., Dunkeld,	1912
	Taylor, Dr W. Macrae, 8 Melville Street,	1895
60	Vatve, Dr Gopal Govind, Shanwar Peth, Kolhapur City, Bombay Presidency, India,	1894
	Wells, Dr A. Simpson, 26 Kloof Road, Cape Town, South Africa,	1903
	Welsh, Dr David, Melton Constable, Norfolk,	1919

(*b.*) ANNUAL SUBSCRIBERS.

	d'Abreu, Dr A. J., c/o Dr O. Regan, New Ross, Co. Wexford, Ireland	1922
	Aitken, Dr C. J. Hill, West Grove, Kilnhurst, W. Rotherham, Yorks,	1902
65	Allison, Dr J., Fuller House, Kettering, Northampton,	1888
	Alston, Dr James, 57 Nile Grove,	1922
	Anderson, Dr R. Brodie, 220 M'Intyre Block, Winnipeg, Manitoba, Canada,	1909
	Anderson, Dr William, Armadale, Linlithgowshire,	1912
	Anklesaria, Dr H. N., Fatch Munzel, New Queen's Road, Bombay 4, India,	1906
70	Armour, Dr E. F., 6 Bruntsfield Terrace,	1889
	Baildon, Dr Francis J., 42 Hoghton Street, Southport,	1887
	Barnetson, Dr Elsie M., 17 Abercorn Terrace, Portobello,	1907
	Barnetson, Dr R. Balfour, 17 Abercorn Terrace, Portobello,	1904
	Beesley, Dr R. W., 135 Deane Road, Bolton,	1894
75	Beesly, Dr Lewis, 42 Northumberland Street,	1904
	Bell, Dr J. Lumsden, The White Hall, Driffield, E. Yorks.,	1884
	Beveridge, Dr Arthur James, Holmlea, Dollar,	1912

List of Fellows

		Date of Admission.
	Beveridge, Dr Gordon, 18 Carlyle Road, Kirkcaldy,	1919
	Bianchi, Dr L. F., 40 Brighton Place, Portobello,	1912
80	Blacklee, Dr Herbert F., Dallington, Abbey Road, Barrow-in-Furness,	1920
	Blaikie, Dr R. H., 5 Mayfield Gardens,	1888
	Blair, Dr J. A., 16 Windsor Terrace, Newcastle-on-Tyne,	1887
	Block, Dr Isidore Jack, O.B.E., 14 Buccleuch Place,	1921
	Bowie, Dr J. M., 53 Grange Road,	1912
85	Brewis, Dr N. T., 6 Drumsheugh Gardens,	1883
	Brewis, Dr R. Adams, The West Gate, Dursley, Gloucestershire,	1888
	Broad, Dr B. W., The Sanatorium, Cardiff,	1895
	Brock, Dr A. J., 8 Rothesay Place,	1912
	Brodie, Dr T. Scott, 21 Belhaven Terrace, Wishaw,	1900
90	Brown, Dr Henry Hilton, 10 Inverleith Row,	1921
	Brown, Dr William, O.B.E., 5 Bon-Accord Square, Aberdeen,	1904
	Brown, Dr W. S. Murdoch, 14 Grosvenor Street,	1912
	Browne, Dr Francis J., 54 Northumberland Street,	1919
	Brownlee, Dr James, Waterloo House, 254 Linthorpe Road, Middlesborough,	1905
95	Buchanan, Dr Robert Wilson, 51 Murraygate, Dundee,	1913
	Buist, Dr R. C., 166 Nethergate, Dundee,	1895
	Butchart, Dr C. A., 52 Leith Walk, Leith,	1894
	Callender, Dr D. M., Highden, Hatherley Road, Sidcup, Kent,	1902
	Callender, Dr T. M., Inverard, Sidcup, Kent.	1896
100	Cameron, Dr S. J., 30 Lynedoch Street, Charing Cross, Glasgow,	1921
	Campbell, Dr Basil Patrick, Westwood, Brechin,	1912
	Carlow, Dr W. W., 25 Walker Street,	1910
	Carmichael, Dr A. N. S., 2 Merchiston Avenue,	1912
	Carmichael, Dr Edward, 21 Abercromby Place,	1887
105	Carmichael, Dr George S., 25 Braid Road,	1909
	Carmichael, Dr Norman Scott, 43 Moray Place,	1908
	Carruthers, Dr G. J. R., 4A Melville Street,	1901
	Cattanach, Dr J. G., 3 Alvanley Terrace,	1893
	Chisholm, Dr A. E., 19 Springfield, Dundee,	1911
110	Christie, Dr Arthur W. Stark, Woodside Cottage, Doune,	1912
	Clark, Dr Katherine S., 16 Drummond Place,	1903
	Clark, Dr Patrick A. Bennet, 45 Moray Place,	1914
	Clarke, Dr Thomas William, 17 Elmwood Gardens, Acton Hill, London, W.3,	1913
	Cox, Dr Joshua J., 72 Bridge Street, Manchester,	1876
115	Craig, Dr James C., 15 Gloucester Gate, London, N.W. 1,	1908
	Craig, Dr J. G., 1 Clifton, York,	1908
	Craig, Dr R. W., Pathhead-Ford, Dalkeith,	1905
	Croll, Dr Andrew, Saskatoon, Saskatchewan, Canada,	1912
	Crothers, Dr Robert, Codrington Mansions, 139 Western Road, Brighton,	1913
120	Currie, Dr A. S., 20 Oxford Terrace, Hyde Park, London, W.	1882
	Darling, Dr William, M.C., 65 Bruntsfield Place,	1900
	Davidson, Dr G. S., Cairnlee, Bieldside, Aberdeenshire,	1921
	Davidson, Dr Samuel, Mansefield, Kelso,	1906
	Davie, Dr P. Cousin, 15 Archer Street, Timaru, New Zealand,	1919
125	Davison, Dr A. W., Sandholme, Church Lane, Whitefield, nr. Manchester,	1920
	Dewar, Dr J. M., 5 Chalmers Street,	1910
	Dewar, Dr M., 5 Chalmers Street,	1891
	Dickson, Dr D. Elliot, Hillcrest, Lochgelly,	1908
	Dickson, Dr George A., Invermae, South Queensferry,	1912
130	Dickson, Dr George, 26 Merchiston Park,	1901
	Dobie, Dr D. Robertson, Earncliffe, Coldwells Road, Crieff,	1894

List of Fellows

		Date of Admission.
	Donald, Dr George, 46 Ferry Road, Leith,	1912
	Dunbar, Dr H. J., 47 Cathedral Road, Cardiff,	1905
	Dyer, Dr Ethelbert W., 402 Moore Road, Durban, South Africa,	1906
135	Easterbrook, Dr C. C., Crichton House, Dumfries,	1892
	Eden, Dr T. Watts, 26 Queen Anne Street, Cavendish Square, London, W.,	1888
	Edington, Dr D. C., Birbeck House, Penrith,	1897
	Elder, Dr Edward A., 4 Battery Road, Singapore, Straits Settlements,	1906
	Elder, Dr Eleanor, 4 John's Place, Leith,	1903
140	Evans, Dr O. F., 20 Princes Avenue, Liverpool,	1890
	Fairfax, Dr Norman P., Caddon View, Innerleithen,	1912
	Fairlie, Dr Margaret, 170 Nethergate, Dundee,	1920
	Fairweather, Dr J. W. C., Maryton, Montrose,	1921
	Farie, Dr G. J., Strathallan, 143 Worple Road, Wimbledon, London, S.W.,	1903
145	Fergusson, Dr Samuel, Lylestone House, Alloa,	1912
	Finlay, Dr Thomas, 3 East Fettes Avenue,	1912
	Finlay, Dr T. Y., 9 Hermitage Gardens,	1908
	Fisher, Dr E. F., 7 Buckingham Terrace,	1920
	Fitzgerald, Dr Gordon, O.B.E., Dunedin, Withington, Manchester,	1913
150	Fleming, Dr Andrew, St John's Road, Corstorphine,	1905
	Flett, Dr A. B., 15 Walker Street,	1903
	Fordyce, Dr William, 17 Walker Street,	1888
	Forrest, Dr Stephen, Alexandria, Egypt,	1910
	Fowler, Dr W. Hope, 21 Walker Street,	1900
155	Fraser, Dr J. Hosack, Fernfield, Bridge of Allan,	1895
	Frost, Dr W. E., 51 Melville Street,	1900
	Galloway, Dr T. M., Hawklymuir, Kirkcaldy,	1921
	Garbutt, Dr W. J., Girthen House, Bournbrook Rd., Selly Pk., Birmingham,	1897
	Gardiner, Dr Frederick, 60 George Square,	1900
160	Gardner, Dr L. P. M., 20 Pilrig Street,	1912
	Gemmell, Dr J. E., 28 Rodney Street, Liverpool,	1885
	Gibbs, Dr J. H., 10 Manor Place,	1905
	Gibson, Dr Alexander, 661 Broadway, Winnipeg, Manitoba, Canada,	1908
	Giles, Dr A. B., 4 Palmerston Place,	1891
165	Gordon, Dr Alexander Stewart, Rosebery House, Inverkeithing,	1920
	Graham, Dr D. J., 2 Melville Crescent,	1895
	Grant, Dr A. G. M., Manchester Sanatorium, Plas Uchaf, Abergele, North Wales,	1914
	Grant, Dr Janet, Health Dept., City Hall, Cardiff,	1921
	Gray, Dr J A., 4 Wolseley Terrace,	1907
170	Green, Dr John Ligertwood, 23 Minto Street,	1902
	Gregory, Dr W. H., North Bar Without, Beverley, Yorks,	1893
	Greig, David M., F.R.C.S.E., 12 Abbotsford Crescent,	1922
	Gunn, Dr James T., Deanswood, Auchterarder,	1912
	Guthrie, Dr A. Cowan, 10 Harley Street, London, W. 1,	1888
175	Hamilton, Dr Martha L., 14 Eyre Crescent,	1919
	Hartley, Dr J. Jackson, O.B.E., 10 Ainslie Place,	1914
	Harvey, Dr Charles, Beckford Lodge, Sav-la-Mar, Jamaica, W.I.,	1889
	Harvey, Dr James, 7 Blenheim Place,	1891
	Haultain, Dr W. F. Theodore, 6 Walker Street,	1922
180	Heard, Richard, Lt.-Col. I.M.S., I.G. Civil Hospital, Pinewood Hotel, Shillong, Assam, India,	1912
	Hendrick, Dr A. C., 20 Bloor Street East, Toronto,	1912
	Hendry, Dr James, 4 Clifton Place, Glasgow,	1919
	Hendry, Dr Wilhelmina, 346 Glossop Road, Sheffield,	1921
	Herzfeld, Dr Gertrude, 8 Randolph Crescent,	1921

List of Fellows

		Date of Admission.
	Beveridge, Dr Gordon, 18 Carlyle Road, Kirkcaldy,	1919
	Bianchi, Dr L. F., 40 Brighton Place, Portobello,	1912
80	Blacklee, Dr Herbert F., Dallington, Abbey Road, Barrow-in-Furness,	1920
	Blaikie, Dr R. H., 5 Mayfield Gardens,	1888
	Blair, Dr J. A., 16 Windsor Terrace, Newcastle-on-Tyne,	1887
	Block, Dr Isidore Jack, O.B.E., 14 Buccleuch Place,	1921
	Bowie, Dr J. M., 53 Grange Road,	1912
85	Brewis, Dr N. T., 6 Drumsheugh Gardens,	1883
	Brewis, Dr R. Adams, The West Gate, Dursley, Gloucestershire,	1888
	Broad, Dr B. W., The Sanatorium, Cardiff,	1895
	Brock, Dr A. J., 8 Rothesay Place,	1912
	Brodie, Dr T. Scott, 21 Belhaven Terrace, Wishaw,	1900
90	Brown, Dr Henry Hilton, 10 Inverleith Row,	1921
	Brown, Dr William, O.B.E., 5 Bon-Accord Square, Aberdeen,	1904
	Brown, Dr W. S. Murdoch, 14 Grosvenor Street,	1912
	Browne, Dr Francis J., 54 Northumberland Street,	1919
	Brownlee, Dr James, Waterloo House, 254 Linthorpe Road, Middlesborough,	1905
95	Buchanan, Dr Robert Wilson, 51 Murraygate, Dundee,	1913
	Buist, Dr R. C., 166 Nethergate, Dundee,	1895
	Butchart, Dr C. A., 52 Leith Walk, Leith,	1894
	Callender, Dr D. M., Highden, Hatherley Road, Sidcup, Kent,	1902
	Callender, Dr T. M., Inverard, Sidcup, Kent.	1896
100	Cameron, Dr S. J., 30 Lynedoch Street, Charing Cross, Glasgow,	1921
	Campbell, Dr Basil Patrick, Westwood, Brechin,	1912
	Carlow, Dr W. W., 25 Walker Street,	1910
	Carmichael, Dr A. N. S., 2 Merchiston Avenue,	1912
	Carmichael, Dr Edward, 21 Abercromby Place,	1887
105	Carmichael, Dr George S., 25 Braid Road,	1909
	Carmichael, Dr Norman Scott, 43 Moray Place,	1908
	Carruthers, Dr G. J. R., 4A Melville Street,	1901
	Cattanach, Dr J. G., 3 Alvanley Terrace,	1893
	Chisholm, Dr A. E., 19 Springfield, Dundee,	1911
110	Christie, Dr Arthur W. Stark, Woodside Cottage, Doune,	1912
	Clark, Dr Katherine S., 16 Drummond Place,	1903
	Clark, Dr Patrick A. Bennet, 45 Moray Place,	1914
	Clarke, Dr Thomas William, 17 Elmwood Gardens, Acton Hill, London, W.3,	1913
	Cox, Dr Joshua J., 72 Bridge Street, Manchester,	1876
115	Craig, Dr James C., 15 Gloucester Gate, London, N.W. 1,	1908
	Craig, Dr J. G., 1 Clifton, York,	1908
	Craig, Dr R. W., Pathhead-Ford, Dalkeith,	1905
	Croll, Dr Andrew, Saskatoon, Saskatchewan, Canada,	1912
	Crothers, Dr Robert, Codrington Mansions, 139 Western Road, Brighton,	1913
120	Currie, Dr A. S., 20 Oxford Terrace, Hyde Park, London, W.	1882
	Darling, Dr William, M.C., 65 Bruntsfield Place,	1900
	Davidson, Dr G. S., Cairnlee, Bieldside, Aberdeenshire,	1921
	Davidson, Dr Samuel, Mansefield, Kelso,	1906
	Davie, Dr P. Cousin, 15 Archer Street, Timaru, New Zealand,	1919
125	Davison, Dr A. W., Sandholme, Church Lane, Whitefield, nr. Manchester,	1920
	Dewar, Dr J. M., 5 Chalmers Street,	1910
	Dewar, Dr M., 5 Chalmers Street,	1891
	Dickson, Dr D. Elliot, Hillcrest, Lochgelly,	1908
	Dickson, Dr George A., Invermae, South Queensferry,	1912
130	Dickson, Dr George, 26 Merchiston Park,	1901
	Dobie, Dr D. Robertson, Earncliffe, Coldwells Road, Crieff,	1894

List of Fellows

		Date of Admission.
	Donald, Dr George, 46 Ferry Road, Leith,	1912
	Dunbar, Dr H. J., 47 Cathedral Road, Cardiff,	1905
	Dyer, Dr Ethelbert W., 402 Moore Road, Durban, South Africa,	1906
135	Easterbrook, Dr C. C., Crichton House, Dumfries,	1892
	Eden, Dr T. Watts, 26 Queen Anne Street, Cavendish Square, London, W.,	1888
	Edington, Dr D. C., Birbeck House, Penrith,	1897
	Elder, Dr Edward A., 4 Battery Road, Singapore, Straits Settlements,	1906
	Elder, Dr Eleanor, 4 John's Place, Leith,	1903
140	Evans, Dr O. F., 20 Princes Avenue, Liverpool,	1890
	Fairfax, Dr Norman P., Caddon View, Innerleithen,	1912
	Fairlie, Dr Margaret, 170 Nethergate, Dundee,	1920
	Fairweather, Dr J. W. C., Maryton, Montrose,	1921
	Farie, Dr G. J., Strathallan, 143 Worple Road, Wimbledon, London, S.W.,	1903
145	Fergusson, Dr Samuel, Lylestone House, Alloa,	1912
	Finlay, Dr Thomas, 3 East Fettes Avenue,	1912
	Finlay, Dr T. Y., 9 Hermitage Gardens,	1908
	Fisher, Dr E. F., 7 Buckingham Terrace,	1920
	Fitzgerald, Dr Gordon, O.B.E., Dunedin, Withington, Manchester,	1913
150	Fleming, Dr Andrew, St John's Road, Corstorphine,	1905
	Flett, Dr A. B., 15 Walker Street,	1903
	Fordyce, Dr William, 17 Walker Street,	1888
	Forrest, Dr Stephen, Alexandria, Egypt,	1910
	Fowler, Dr W. Hope, 21 Walker Street,	1900
155	Fraser, Dr J. Hosack, Fernfield, Bridge of Allan,	1895
	Frost, Dr W. E., 51 Melville Street,	1900
	Galloway, Dr T. M., Hawklymuir, Kirkcaldy,	1921
	Garbutt, Dr W. J., Girthen House, Bournbrook Rd., Selly Pk., Birmingham,	1897
	Gardiner, Dr Frederick, 60 George Square,	1900
160	Gardner, Dr L. P. M., 20 Pilrig Street,	1912
	Gemmell, Dr J. E., 28 Rodney Street, Liverpool,	1885
	Gibbs, Dr J. H., 10 Manor Place,	1905
	Gibson, Dr Alexander, 661 Broadway, Winnipeg, Manitoba, Canada,	1908
	Giles, Dr A. B., 4 Palmerston Place,	1891
165	Gordon, Dr Alexander Stewart, Rosebery House, Inverkeithing,	1920
	Graham, Dr D. J., 2 Melville Crescent,	1895
	Grant, Dr A. G. M., Manchester Sanatorium, Plas Uchaf, Abergele, North Wales.	1914
	Grant, Dr Janet, Health Dept., City Hall, Cardiff,	1921
	Gray, Dr J A., 4 Wolseley Terrace,	1907
170	Green, Dr John Ligertwood, 23 Minto Street,	1902
	Gregory, Dr W. H., North Bar Without, Beverley, Yorks,	1893
	Greig, David M., F.R.C.S.E., 12 Abbotsford Crescent,	1922
	Gunn, Dr James T., Deanwood, Auchterarder,	1912
	Guthrie, Dr A. Cowan, 10 Harley Street, London, W. 1,	1888
175	Hamilton, Dr Martha L., 14 Eyre Crescent,	1919
	Hartley, Dr J. Jackson, O.B.E., 10 Ainslie Place,	1914
	Harvey, Dr Charles, Beckford Lodge, Sav-la-Mar, Jamaica, W.I.,	1889
	Harvey, Dr James, 7 Blenheim Place,	1891
	Haultain, Dr W. F. Theodore, 6 Walker Street,	1922
180	Heard, Richard, Lt.-Col. I.M.S., I.G. Civil Hospital, Pinewood Hotel, Shillong, Assam, India,	1912
	Hendrick, Dr A. C., 20 Bloor Street East, Toronto,	1912
	Hendry, Dr James, 4 Clifton Place, Glasgow,	1919
	Hendry, Dr Wilhelmina, 346 Glossop Road, Sheffield,	1921
	Herzfeld, Dr Gertrude, 8 Randolph Crescent,	1921

List of Fellows

		Date of Admission.
185	Hewetson, Dr J., Holmfield, Reigate,	1881
	Hirschman, Dr Nathaniel, 14 Buccleuch Place,	1922
	Hoggan, Dr Robert, Liberton Park, Liberton,	1894
	Holland, Dr Eardley L., 55 Queen Anne Street, London, W.1,	1920
	Holmes, Capt. Frank, R.A.M.C., "B" Section, 82nd Gen. Hospital, B.C.O., Constantinople,	1922
190	Honeyford, Dr John, Dyke, Forres, Morayshire,	1922
	Hume, Dr Wm. Maitland, Bushey Lodge, Teddington, Middlesex,	1911
	Hunter, Dr A. J. Gordon, 41 Castle Street, Dumfries,	1910
	Huskie, Dr David, Hamilton House, Moffat,	1912
	Impey, Dr Lance, 8 Essotto Court, Breda Street, Cape Town, S. Africa,	1920
195	Inch, Dr T. Douglas, O.B.E., M.C., Stobsmills House, Gorebridge,	1914
	Jardine, Dr F. E., 83 Great King Street,	1910
	Jardine, Dr Robert, 20 Royal Crescent, Glasgow, W.,	1897
	Johnston, Dr G. Minto, 36 Esslemont Road,	1912
	Johnston, Dr Robert B., 13 Lonsdale Terrace,	1903
200	Kalyanvala, Dr D. N., Chief Med. Off., Porbandar State, Bombay Presidency, India,	1922
	Keir, Dr Ivan C., Beauacre, Melksham, Wilts,	1903
	Kynoch, Professor Campbell, 8 Airlie Place, Dundee,	1892
	Lange, Dr Gustav, 14 Buccleuch Place,	1922
	Langwill, Dr Arch., 15 Marloes Road, London, W. 8,	1913
205	Langwill, Dr H. G., 4 Hermitage Place, Leith,	1891
	Langwill, Dr James, Lisaghmore, Kirkcaldy,	1911
	Lawrie, Dr Thomas Harcourt, St Clair, Polmont Station, Stirlingshire,	1912
	Ledger, Dr A. G. K., Chantry House, Shoreham, Sussex,	1906
	Lee, Dr Alaister Fraser, 36 Great King Street,	1920
210	Lee, Dr Herbert E., Coolabah, Belmore Street, Burwood, N.S.W., Australia,	1892
	Lindsay, Dr D. M., 8 Park Quadrant, Glasgow,	1921
	Lindsay, Dr G. M. S., 25 Warriston Crescent	1921
	Liston, Dr R. Prosper, Kensey, Penang, Straits Settlements,	1922
	Littlejohn, Professor Harvey, 11 Rutland Street,	1890
215	Lochhead, Dr James, Castle Road, Gibraltar,	1904
	Lorimer, Dr Duncan, 2 Forbes Road,	1906
	Lowry, Professor Chas. Gibson, 12 University Square, Belfast,	1920
	Lyle, Dr R. P. Ranken, Holmwood, Clayton Road, Newcastle,	1901
	M'Cann, Dr F. J., 14 Wimpole Street, Cavendish Square, London, W. 1,	1896
220	Macdonald, Dr Angus, 38 Colinton Road,	1897
	Macdonald, Dr John, Marathon House, Cupar-Fife,	1902
	Macdonald, Dr W. Fraser, 42 Polwarth Terrace,	1910
	M'Ewan, Dr Peter, 7 Blenheim Mount, Manningham Lane, Bradford,	1905
	MacGregor, Dr Alastair, 14 Welbeck St., London, W.1,	1905
225	MacGregor, Dr A. V., Durham House, West Hartlepool,	1895
	M'Intosh, Dr A. Morrison, C.M.G., 17 Brights' Crescent	1912
	Mackay, Dr W. B., 23 Castlegate, Berwick-on-Tweed,	1899
	M'Kendrick, Dr Archd., 12 Rothesay Place,	1906
	Mackenzie, Dr T. C., Ruigh-Ard, Inverness,	1900
230	M'Kerron, Dr R. Gordon, 2 Queen's Terrace, Aberdeen,	1896
	Mackin, Dr Patrick, 132 Vizean Street, Wellington, New Zealand,	1895
	Mackness, Dr G. Owen C., Auchlean, Broughty-Ferry,	1887
	M'Laren, Dr John, 39 Lauriston Place.	1910
	M'Laren, Dr Robert, 10 Gilmore Place,	1912
235	M'Larty, Dr Malcolm, 23 Abercromby Place,	1900

List of Fellows

		Date of Admission.
	Maclean, Dr Ewen J., 12 Park Place, Cardiff,	1902
	Maclean, Dr Jean, Infirmary and Dispensary, Bolton,	1921
	MacPherson, Dr J. M., 17 Midmar Gardens,	1921
	Malcolmson, Dr Alexander M., 1 Belgrave Road, Corstorphine,	1901
240	Mallace, Dr A. C., Elm House, Hawick,	1908
	Marshall, Dr L. R. H. P., The Briars, Peebles,	1912
	Martin, Dr Angus, 25 Northumberland Square, North Shields,	1906
	Martin, Dr Charles, Abernant Lake Hotel, Llanwrtyd Wells	1892
	Martin, Dr Norman Alexander, c/o Dr Philip, Bon Accord House, Morpeth, Northumberland,	1926
245	Matheson, Dr Angus, Duntulm, North Berwick,	1912
	Meikle, Dr J. Hally, 12 Midmar Gardens,	1906
	Menzies, Dr W. Menzies, 25 Castle Terrace,	1910
	Miller, Dr A. S., Rannoch House, Tranent,	1912
	Miller, Dr Douglas Alexander, 50 Northumberland Street,	1920
250	Milligan, Dr Harley P., Hessle, East Yorks,	1908
	Milne, Dr W. Morrison, 3 Minto Street,	1898
	Mitchell, Dr C. R. P., The Chase, Malvern,	1906
	Molony, Capt. J. B. de Winton, O.B.E., I.M.S., c/o Chartered Bank of India, Australia, and China, Bombay,	1922
	Moorhouse, Dr J. Ernest, 6 Melville Terrace, Stirling,	1892
255	More, Dr John, Rothwell, Kettering,	1908
	Morison, Dr Albert E., St George's Square, Sunderland,	1888
	Morris, Dr George, 2 Morningside Park,	1922
	Mowat, Dr R. S., 40 Raeburn Place,	1910
	Munro, Dr J. Ramsay, High Street, Spalding,	1901
260	Murray, Dr E. Farquhar, 52 Jesmond Road, Newcastle-on-Tyne,	1920
	Murray, Dr James, 51 Great King Street,	1879
	Murray, Dr Janet, 18 Carrick Road, Ayr,	1921
	Nasmyth, Dr Alexander, Hillwood House, Penicuik,	1912
	Newton, Dr R. H. H., 5 Murrayfield Avenue,	1922
265	Ogilvy, Dr Stewart Grant, Fairmont, Fauldhouse,	1895
	Oliphant, Dr E. H. Lawrence, 23 Newton Place, Glasgow,	1885
	Orbell, Dr Ronald S., 12 Reed Street, Oamaru, New Zealand,	1907
	Orr, Dr John, Heather Lea, Clarendon Road, Eccles, Lancs.,	1887
	Orr, Dr John, 6 Strathearn Road,	1912
270	Orr, Dr T. S. A., 33 Welbeck Street, London, W. 1,	1912
	Orr, Dr W. Basil, 13 Braid Road,	1889
	Patch, Capt. C. Lodge, I.M.S., c/o King & King, P.O. Box 110, Bombay,	1913
	Paterson, Dr G. Keppie, 19 Albany Street,	1882
	Pearson, Dr C. Mowbray, 14 Manor Place,	1902
275	Pearson, Dr J. H. H., 1 Stirling Road,	1912
	Pell, Dr J. W., Hodge Memorial Hospital, Hankow, China,	1914
	Perigal, Dr Arthur, New Barnet, Herts,	1887
	Peterson, Dr George R., Saskatoon, Saskatchewan, Canada,	1912
	Playfair, Dr John, 5 Melville Crescent,	1873
280	Poole, Dr T. D., North Side House, Linthwaite, Huddersfield,	1890
	Porter, Dr Frederick, 65 Morningside Road,	1904
	Prentice, Dr W. H., Rosebank, Bolton Road, Pendleton, Manchester,	1901
	Price, Dr A. W. Gordon, 45 Grange Road,	1890
	Primrose, Dr Alex., 100 College Street, Toronto, Canada,	1887
285	Pringle, Dr J. Hogarth, 172 Bath Street, Glasgow,	1886
	Proudfoot, Dr Frank Grégoire, 43 St Giles, Oxford,	1913
	Rabagliati, Dr A. H., 640 Musgrave Road, Durban, Natal,	1903
	Ritchie, Dr George B., 9 Brunswick Street,	1912
	Ritchie, Dr James, Craigowan, Colinton Road,	1880

List of Fellows

		Date of Admission.
290	Ritchie, Dr T. C., O.B.E., Prospect House, Malpas, Cheshire,	1911
	Robarts, Dr Henry H., 1 Wemyss Place, Haddington,	1904
	Roberton, Dr Ernest, Remeura Road, Auckland, New Zealand,	1887
	Robertson, Dr Robert, 44 Melville Street,	1897
	Robertson, Dr R. Macdonald, 53 Bruntsfield Place,	1912
295	Ronaldson, Dr R. Miller, 9 Melville Crescent,	1912
	Rose, Dr Joan K., 10 Blenheim Place,	1922
	Ross, Dr T. W. E., 31 Morningside Road,	1904
	Rutherford, Dr A., 24 Palmerston Place,	1921
	Saunders, Dr F. A., Hill Street, Grahamstown, Cape Colony, South Africa,	1885
300	Scott, Dr Alexander, The Firs, Broxburn,	1906
	Scott, Dr T. R., 13 High Street, Musselburgh,	1880
	Secord, Dr E. R., 112 Market Street, Brantford, Ontario, Canada,	1902
	Selkirk, Dr W. J. Burns, Kenmore, Sutton Road, Erdington, Birmingham,	1912
	Shannon, Dr David. 26 Woodside Place, Glasgow,	1910
305	Shaw, Dr C. J., Sunnyside Asylum, Montrose	1903
	Shearer, Dr Alfred, The Bank, Newtown, N. Wales,	1898
	Silberbauer, Dr Stanley F., 9 Hof Street, Cape Town, South Africa,	1912
	Simpson, Dr Archibald, Murivance, Shrewsbury,	1906
	Simpson, Dr F. D., 49 Melville Street,	1900
310	Slight, Dr J. D., 163 London Road, Leicester,	1898
	Sloan, Dr Allen T., 22 Abercromby Place,	1893
	Smith, Dr John, Bryce Hall, Kirkcaldy,	1885
	Smith, Dr W. Ramsay, Central Board of Health, Adelaide, South Australia,	1892
	Smith, Dr W. Torrance, 70 Woodlands Road, Aigburth, Liverpool,	1906
315	Sneddon, Dr William, Logan Bank, Cupar-Fife,	1888
	Somerville, Dr C., Viewpark, Bonnyrigg,	1902
	Somerville, Dr James W.. The Grange, Galashiels,	1902
	Spence, Dr John W. L., 10 Dundas Street,	1912
	Sprunt, Dr Thomas, Pathological Department, University, Edinburgh,	1922
320	Stark, Dr J. Nigel, 4 Newton Place, Charing Cross, Glasgow,	1908
	Steen, Dr Horatio W. J., c/o Haldane, 371 Bath Street, Glasgow,	1922
	Stephen, Dr W. A., Loftus-in-Cleveland, Yorkshire,	1894
	Steuart, Dr Murray B., Oakley, Kirkcudbright.	1912
	Stevens, Dr John, 78 Polwarth Terrace,	1894
325	Stewart, Dr A. M., 196 Ferry Road, Leith,	1913
	Stewart, Dr R., 25 George Square,	1885
	Stewart, Dr T. M. J., 127 Princes Avenue, Hull,	1921
	Stewart, Dr W. Ross, Major, I.M.S., Bangalore United Services Club, Bangalore, India,	1921
	Stewart-Sandeman, Dr Laura, 22 Waverley Place, Aberdeen,	1912
330	Stirling, Dr R., 4 Atholl Place, Perth,	1892
	Strachan, Dr G. I., Windsor Place, Cardiff,	1921
	Strain, Dr Arthur C., 3 Clifton Avenue, West Hartlepool,	1904
	Struthers, J. W., F.R.C.S.E., 15 Ainslie Place,	1922
	Temple, Dr G. H., Ailanthus, Weston-super-Mare,	1888
335	Thatcher, Dr C. H., 8 Melville Crescent,	1877
	Thatcher, Dr L. H. F., 8 Melville Crescent,	1910
	Thin, Dr Robert, 25 Abercromby Place,	1891
	Thompson, Dr James L., Castlemaine, Victoria, Australia,	1894
	Thomson, Dr A. D. R., 19 Bridge Street, Musselburgh,	1877
340	Thomson, Dr John, 14 Coates Crescent,	1887
	Thomson, Dr T. J., 3 Greenhill Park,	1902
	Thyne, Dr T. J., 16 Randolph Crescent,	1887
	Tod, Dr John, 67 Ferry Road, Leith,	1892

List of Fellows

		Date of Admission.
	Tolmie, Dr Peter Morrison, Hull Tuberculosis Sanatorium, Cottingham, E. Yorks	1920
345	Tristan, Dr R. J., 28 Carolgate, Retford, Notts,	1887
	Tuke, Dr A. L. S., 12 Comely Park, Dunfermline,	1911
	Venters, Dr Isabel, 2 Greenhill Gardens,	1907
	Walker, Dr Arthur S., Caledonian U.S. Club,	1906
	Ward, Dr Gladys, 65 Wallwood Road, Leytonstone, London, E. 11	1921
350	Watson, Professor B. P., 8 Manor Place,	1902
	Watson, Dr H. Ballingall, 1 Clifton Terrace,	1921
	Watson, Dr R. H., 46 London Road, Dover,	1896
	Watt, Dr Robert Honey, Esk Villa, Langholm, Dumfries,	1912
	White, Dr A. L., 145 Manchester Road, Rochdale, near Manchester,	1903
355	Wilson, Dr James, Almora, Abbotsford Crescent,	1889
	Wood, Dr A. Murray, 180 Ferry Road, Leith,	1912
	Wood, Dr Thomas, 182 Ferry Road,	1886
	Young, Dr James, 29 Manor Place,	1907

CONTENTS

I.—COMMUNICATIONS RELATING TO OBSTETRICS

PAGE

1. Valedictory Address. The President, William Fordyce . . 3
2. A Case of Cæsarean Section in Multiple Pregnancy. William Fordyce 41
3. A Case of Ovarian Dermoid rupturing into the Bowel during Labour. Hugh S. Davidson 54
4. Cæsarean Section and Alternative Treatment. J. Lamond Lackie 61
5. The Induction of Premature Labour in Cases of Disproportion. H. Oliphant Nicholson 73
6. Icterus Neonatorum. E. Farquhar Murray . . . 86
7. Omphalorrhagia, with a Record of Two Cases. Douglas Miller . 97
8. Record of Eclampsia in the Royal Maternity Hospital, Edinburgh, during Ten Years, 1912-1921. H. S. Davidson and Douglas Miller 121

II.—COMMUNICATIONS RELATING TO GYNECOLOGY

1. Pneumoperitoneum of the Pelvis as an Aid to Gynecological Diagnosis. R. Lance Impey 21
2. Inversion of the Uterus, with a Record of Four Cases. James Haig Ferguson 33
3. The Diagnosis and Treatment of Acute Tubal Peritonitis. J. W. Struthers 45
4. Further Study of an Organism obtained from Cancerous Growths. James Young 110

INDEX 135

Statement of Accounts, 1st November 1920 to 31st October 1921

INCOME

Entrance Fees (26)		£27 6 0
Annual Subscriptions, including arrears (311)		175 10 6
Dividends from Consols		4 9 0
Dividends from N.B.R. Stock		6 6 0
Interest on Deposit Receipts		1 14 2
Donation to Society		1 0 0
Cash from Union Bank Cheques		0 1 4
		£216 7 0
FUNDS at 31st October 1920—		
£250 2½% Consols at cost	£250 10 6	
£300 3% N.B.R. Debenture Stock at cost	254 16 0	
Cash in Current Account	11 4 6	
		516 11 0
		£732 18 0

EXPENDITURE

Bank Charges and Cheque Books		£0 17 11
Postages, etc. (Treasurer)		0 2 6
" " (Secretary)		1 0 0
Postage and Printing of Billets		32 3 6
Hire of Hall		10 0 0
Hallkeeper		2 0 0
Reporting at Meetings		8 8 0
Other Outlays for Meetings		0 5 0
Lantern Demonstrations		6 11 0
" " (1919-20)		1 17 0
Income Tax		0 12 0
Corporation Duty		0 17 4
Insurance		0 2 6
Stationery		9 3 2
Typing and Printing Circulars re *Transactions*		9 2 3
		£83 2 2
FUNDS at 31st October 1921—		
£250 2½% Consols at cost	£250 10 6	
£300 3% N.B.R. Debenture Stock at cost	254 16 0	
Cash on Deposit Receipt	135 0 0	
Cash in Current Account	9 9 4	
		649 15 10
		£732 18 0

W. MACRAE TAYLOR, *Treasurer.*

EDINBURGH, *2nd November* 1921.—We have examined the Accounts of the Obstetrical Society for the year to 31st October ult., and, having compared them with the vouchers, find them to be correct. We have seen the Securities and the Deposit Receipt for £135.

ROBERT THIN,
G. KEPPIE PATERSON, } *Auditors.*

Transactions
of the
Edinburgh Obstetrical Society

SESSION LXXXI.—1921-1922

At the First Meeting of the Society held on 9th November 1921 the following Office-Bearers were elected for the ensuing Session :—

President

Dr J. LAMOND LACKIE.

Vice-Presidents

**Senior*—Dr J. HAIG FERGUSON. | *Junior*—Dr WILLIAM FORDYCE.

Secretaries

Senior—Dr H. S. DAVIDSON, 50 Manor Place. | *Junior*—Dr JAMES YOUNG, 29 Manor Place.

Treasurer

Dr W. MACRAE TAYLOR,
8 Melville Street.

Librarian

Dr R. W. JOHNSTONE.

Editor of Transactions

Dr F. J. BROWNE,
10 Seton Place.

Members of Council

*Dr D. ROBERTSON DOBIE.	Dr ROBERT STEWART.
*Dr ROBERT ROBERTSON.	Dr H. S. LANGWILL.
*Dr A. B. FLETT.	Dr JOHN CRAIG.
Dr N. T. BREWIS (*for one year*).	Dr A. GRAHAM RITCHIE.

* Those marked with an asterisk were elected last year to hold office for two years.

Transactions

of the

Edinburgh Obstetrical Society

VALEDICTORY ADDRESS:

"The Society during Sessions 1919-1921."*

By The PRESIDENT, Dr WM. FORDYCE.

In vacating the Presidential Chair, which it has been my high honour to occupy during the past two years, I desire to thank you very cordially for the help and kind consideration you have extended to me in the discharge of my duties. This help and forbearance I felt I could rely upon when I accepted office, and I have not been disappointed. My gratitude, however, is none the less sincere, and is only equalled by a very keen sense of my many shortcomings from my own ideals and from the high standard set before me by the fourteen Presidents under whom I have sat since I joined this Society in 1888.

My tenure of office has coincided with what may be called a period of reconstruction following on the suspension of our activities for five years owing to the Great War. This reconstruction, or resuscitation, after such a long period of suspended animation, has been more rapid and complete than might reasonably have been expected, and is at once a strong proof of the vitality of our Society, in spite of its advancing years, and a promise of its future continued success and usefulness. Our meetings have been well attended, and the volumes of our *Transactions* for the past two years show a record of work accomplished that will compare favourably with that of any two previous years in our history.

We have admitted forty-nine new Ordinary Fellows; and as a mark of our appreciation of their distinguished services to Obstetrics and Gynæcology we have elected to the Roll of our Honorary Fellowship Emeritus-Professor Sir J. Halliday

* Delivered 9th November 1921.

Croom, to whom our Society and the School of Medicine in Edinburgh are signally indebted in many ways, and who, we trust, will long be spared to guide us by his sage advice, and to grace our proceedings by his genial personality; Dr W. L. Reid of Glasgow, Professor Herbert Spencer, Dr Amand J. Routh, and Sir John Phillips of London, Sir W. J. Smyly of Dublin, and Dr A. Brindeau of Paris.

I regret to say that our financial position has caused us some anxiety. Our expenditure now exceeds our income, and has rendered necessary for two years a serious encroachment on our capital which, like other securities, is at the present moment unfortunately much depreciated in value. This state of affairs, as you are aware, is due almost entirely to the increased cost of the publishing of our annual volume of *Transactions*, and has been the subject of much careful deliberation and consideration on the part of your Council. The outcome of these deliberations as to how this unfortunate crisis in our finances could best be met was a recommendation regarding the future publication of our *Transactions* with which you are now all familiar and which, therefore, I need not enlarge upon. The whole subject was fully discussed at two of our meetings last Session, and it was finally resolved that, as the matter was so important (the Council's recommendation involving such radical and far-reaching changes), the proposal should be submitted to each Fellow before coming to a final decision. This was accordingly done in a Memorandum circulated last August, in which all the facts of the position were stated, and at the same time an expression of opinion was invited on the Council's recommendation. The results of the Referendum are now to hand and have just been placed before you. Of the 400 Fellows on our Roll, replies have been received from 215. Of these, 185 approve of the scheme for the publication of our *Transactions* in the *Edinburgh Medical Journal*, as recommended by the Council, and are willing to pay the increased subscription of two guineas involved thereby. Twenty-two only disapprove.

With such a large majority in favour of the Council's recommendation, we have decided this evening on the general principle that in future our *Transactions* shall be issued monthly, along with the *Transactions* of our sister Society, the Medico-Chirurgical Society of Edinburgh, in the *Edinburgh Medical Journal*. Much has yet to be done, and many details

will have to be adjusted, and all these matters will receive the very careful attention of your Council. Some change was absolutely necessary, and having come to this decision I trust we will all join in a wholehearted endeavour to make the scheme a success, both in the interests of our own Society, and in the wider interests of the Edinburgh Medical School generally.

From the Presidential Chair, which I am about to leave, I make a very earnest appeal on behalf of the Council to those Fellows who have expressed their unwillingness to fall in with the Council's recommendation, that they will reconsider their attitude and help us by coming into line with the majority and remain on our Roll of Fellowship. I would also appeal to every Fellow to make an individual and personal effort to secure new members for our Society. If this is done, I feel sure the success of the scheme is assured, and that, as a result of the larger circulation of our *Transactions*, our ancient and historic Society will gain fresh strength and extend its sphere of usefulness.

In my introductory remarks last year, I referred to the great loss we had sustained by the death of one of our most distinguished Fellows, David Berry Hart, whose name will ever be remembered for the many valuable scientific contributions he made to the advancement of our knowledge in Obstetrics and Gynæcology, and who so notably in his life and work maintained the high traditions of our Edinburgh School in these departments of medicine.

I deeply deplore that it is again my sorrowful duty to say a few words in appreciation of another Fellow whom death has removed from our midst since last we met, who along different lines was no less distinguished, whose loss we no less deeply mourn, and to whom we are no less indebted for the very active and practical interest he took in our affairs for many years.

Dr Francis William Nicol Haultain, who died in Edinburgh on July 20 of this year, after a comparatively short illness, at the age of 60, was admitted a Fellow of our Society in 1884. He acted as Secretary from 1893-97, as Librarian from 1899-1909, and was elected President in 1910, which post he filled with high distinction for two years. For the long period of thirty-seven years he was rarely absent from our meetings, took an active part in our discussions, and gave us many valuable papers, which not only enriched the volumes of our *Transactions*, alike to the general practitioner and specialist, but will always

have an honoured place in the literature of Obstetrics and Gynæcology.

His papers, and the part he took in our debates, were characterised by a clearness of style and diction, and so often illuminated by clever epigram and humour, that his written or spoken word never failed to command attention. Of an eminently practical turn of mind, he rarely indulged in theorising, and if at times he seemed to revel in unorthodoxy, he was always able and ready to support his opinion by the logic of fact and personal experience.

Haultain read his first paper to our Society in 1889, on "Exfoliation of the Bladder in the Female," and from that date until the year of his death, in spite of the many calls upon him, in an active and busy life as teacher, obstetrician and gynæcologist, he almost never failed to contribute one or more papers each year to our meetings, and during this period, from time to time, exhibited a very large number of most interesting and valuable specimens.

His communications were, as I have said, mostly of a practical nature, and cover a wide range of subjects. In those of a more distinctly clinical character, Haultain was, I think, at his best, for in these he drew upon the large store of experience he had gained in an extensive private and hospital practice. He always had some definite message, something new or useful to advocate, a warning to give, or fresh light to throw on a subject, which the title of his paper might have led one to suppose was pretty well exhausted—and surely we have never had in our Society one who could more skilfully point his moral, or more gracefully adorn his tale.

What I mean can be gathered by a perusal of such papers as "Clinical Experience of Ectopic Gestation and Allied Conditions," "The Treatment of Dysmenorrhœa," "Some Practical Points in the Life-history of Uterine Fibromyomata," "Notes on Some Cases of Eclampsia Treated by Veratrone," "A Plea for a Rational Puerperium," and his papers on "Twilight Sleep," of which he was such an enthusiastic advocate.

All these, and many others of a similar nature, published in our *Transactions* and other Journals, might be mentioned, which are a veritable mine of original and highly interesting clinical information, and which I earnestly hope will one day be collected into one volume, and so rendered more accessible to the students of Obstetrics and Gynæcology than they are at

present, when scattered through so many volumes of our *Transactions* and other publications. Such a volume would, I am sure, be most valuable and warmly welcomed, and would form a fitting memorial of one, who during his life was always so ready and willing to pass on to others the benefits of his wide and varied clinical experience.

In another series of papers on subjects connected with the scientific and pathological aspects of Obstretrics and Gynæcology, as distinct from the more purely clinical, Haultain made many important contributions to our present knowledge. As examples, reference may be made to his papers on the "Serum Treatment of Puerperal Fever," "Uterine Neoplasms," "Adenoma of the Vagina," his classic contribution, on "Chorion Epithelioma," read before the Edinburgh Pathological Club, and his monograph on "Uterine Fibroids," in Clifford Allbutt's *System of Gynæcology*, which has never been surpassed, and which is constantly referred to in dissertations on this subject.

As obstetrician and gynæcologist, Haultain was an exceptionally skilful and able operator, but I think his fame as a surgeon will always rest on the brilliant success he attained in the operation of hysterectomy for the removal of uterine fibroids. He was one of the pioneers of this department of surgery in Edinburgh, and did much, both by his work and the papers he published on this subject, to popularise and establish the operation.

Personally, Haultain was one of the most popular men in medical circles in Edinburgh. His wide sympathies, his varied interests and accomplishments in the realm of sport, his cheery optimism and kindly nature, and, above all, his sterling honesty of purpose and practice, endearing him to a larger circle of friends than falls to the lot of most men. We, as a Society, deeply mourn his loss, and to his widow and son we all tender our affectionate and sincere sympathy.

Dr Thomas Arthur Helme of Manchester, who died on 5th September of this year, was for a few years after his graduation an active member of our Society, and laid the foundation of his subsequent brilliant career as gynæcologist and obstetrician in the north of England by some valuable scientific work among us here in Edinburgh. As Freeland Barbour Research Fellow he investigated the histological changes in the muscle fibre, connective tissue, and blood-vessels of the uterus during pregnancy and the puerperium,

which he subsequently embodied in his M.D. thesis, for which he was awarded a Gold Medal. To those of us who knew Helme in his Edinburgh days—and there are still among us some of his more intimate friends of that time—his rapid rise to fame after he went to Manchester about 1894 was no surprise. He was even then a man of quite exceptional ability, and of the keenest enthusiasm in his work. As a consulting gynæcologist he soon built up a large practice all over the north of England, and was one of the small band of Edinburgh graduates who established the reputation of Manchester as a famous school in gynæcology.

In the course of his busy life he found time to make many important contributions to the literature of Obstetrics and Gynæcology, which all bear the stamp of his Edinburgh training. One of these, written in 1907, on "The Unborn Child: its Care and its Rights," was probably the outcome of his interest in the work of his intimate personal friend and contemporary, Dr J. W. Ballantyne, to whose writings the present day attention and importance attaching to all pre-maternity problems are so largely due. Outside his professional work, Helme was deeply interested in medical politics, and devoted much time to this subject in the interests of the profession, both locally and generally.

Writing in the *British Medical Journal* on this point, Dr Goodfellow of Manchester says: "For many years Helme's personality was inseparably connected with the developments of the British Medical Association in Lancashire and Cheshire, and so it happened that when the crisis of the National Insurance Bill came his colleagues turned to him as their natural leader. There are many who remember with astonishment the amount of concentrated energy which a man of his constitution was able to devote to this work, for he was then in mid-career in a busy consulting practice, and his Chairmanship of mass meetings of the profession, close committee work and innumerable conferences, both locally and in London, must have sufficed to satisfy the most ravenous appetite; but Helme felt that a great trust had been delivered into his hands, and his fixity of purpose permitted him to be satisfied with nothing less than the best that was in him. The final conference between the Chairman of the Manchester Insurance Committee and delegates from a mass meeting, held at a late hour on the night before the Insurance Act was to

become operative, is historical in that from it was evolved the 'Manchester and Salford system' of working the Act, and the part taken in it by Helme—himself a strong opponent of the Bill—was that of an able diplomatist."

During the war he was Chairman of the Manchester Local War Committee, and last year was President of the Manchester Edinburgh University Club. His death is mourned by a wide circle of friends, both private and professional, and removes from our Roll yet another of our most eminent Fellows.

A review of the work accomplished during the past two years, which it is the customary duty of your retiring President to present, shows a record of which we have every reason to be proud. The various communications have all been of great interest, many of them of outstanding importance and great scientific value, while the discussions arising out of them were always animated and instructive.

I may note in passing that there has been a marked diminution in the number of specimens, pathological or otherwise, which have been exhibited at our meetings as compared with former years. This, I think, is to be regretted. We cannot have clinical meetings with exhibition of patients like the Medico-Chirurgical Society, but the exhibition of specimens, with clinical notes can, to a certain extent, make up for this. The short discussions which often arose in this connection used to form a very interesting and instructive feature of our proceedings. I venture to recommend this matter to our energetic Secretaries for their consideration.

Dr Lamond Lackie's paper on "Artificial Rotation of the Head in Persistent Occipito-posterior Positions" raised anew the question of the management of labour in this highly important class of case. No subject, I am sure, is of greater practical interest to obstetricians. Occipito-posterior cases form, as Dr Lackie stated, the bulk of the difficult cases met with in obstetric practice, and their non-recognition and consequent mismanagement are accountable for a large number of fœtal and maternal deaths, in both hospital and private practice, and where death does not ensue we see the results in many a maimed child, and to a still greater extent among our gynæcological patients. A child lost during labour, due to faulty position alone, should be considered a blot on the obstetrician's reputation, and yet I fear this is still far from

being the case. Newell of Boston in an address on this subject, puts the matter very forcibly. He says: "Until the obstetrician is willing to admit honestly that every bad result which occurs in his practice, in the absence of unpreventable complications, is due at least to an error of judgment, if not to negligence on his part, we cannot expect to put obstetrics on a proper basis, and the results will remain more or less unsatisfactory." Dr Lackie is to be congratulated on having focussed our attention once again on this very important matter. The paper, as was to be expected, gave rise to a lively discussion, which was taken part in by most of the Fellows present.

In a very elaborate paper entitled "Suggestions as to the Causes of the Persistence of Puerperal Septicæmia since the End of Pre-antiseptic Days," Dr Berry Hart analysed the factors in puerperal septicæmia due to faulty technique on the part of the obstetrician. This was the last paper out of a long series that he read before our Society, and if at the time some of us thought that it was lacking in that clearness and point which characterised his earlier work, I am sure this was due alone to the manner of its delivery. As published in our last volume it is a paper which will well repay careful study, and is a valuable contribution to the literature of this all-important subject.

Hydatidiform degeneration of the chorion, though a comparatively rare condition, has always been of special interest to the obstetrician, but it acquired a fresh significance when it was found to be so frequently the precursor of chorion epithelioma. To be able to determine in any particular case of hydatid mole if it is, or is not, of a malignant nature, is evidently a matter of the very greatest importance. Much has been written on this subject in recent years, but there is such a want of unanimity in the conclusions of the various writers that the question is still undecided. From a study of four cases of hydatid mole removed by hysterectomy *in situ*, and two specimens of chorion epithelioma, Dr F. J. Browne essayed to settle this problem, and the results of his investigations were laid before us in a strikingly original communication. From a histological examination of these various specimens, Dr Browne was able to come to a very definite conclusion as to which moles were malignant and which benign, the determining factor being the character of the Langhans cells, the presence

of these of large size and in active mitosis being, according to him, of evil prognostic significance. I am not aware that Dr Browne's conclusions have been verified by other observers, but we all felt it was a highly valuable and original communication, and as such it was cordially welcomed by all the Fellows.

Dr Robert Robertson, who has devoted much time and study to the subject, gave his experience of vaccine therapy in obstetric and gynæcological cases, and recorded some very striking results in the treatment of menorrhagia by this method. He made an earnest appeal for its more extended use in intractable and chronic gynæcological cases.

In his paper on "The Colour Scheme in Pregnancy," Dr Ballantyne, from a careful analysis of the pigmentation of 256 pregnant women attending the antenatal clinique at our Maternity Hospital, brought out some interesting facts which were opposed to the generally accepted view as regards these pigmentations, and suggested that the degree of pigmentation was probably due to variations in the reaction of the endocrin glands during pregnancy, more than to the complexion of the individual, as is generally supposed. The bearing of this on other gestational problems, such as the toxæmias of pregnancy, was touched upon in Dr Ballantyne's own delightfully suggestive and original manner.

Suppression of urine in pregnancy, and the puerperium and its relation to symmetrical necrosis of the renal cortex was the subject of an elaborate clinical and pathological paper by Professor Robert Jardine and Dr R. M. Kennedy of Glasgow, and led to a lively discussion, along pathological lines, as to the cause and nature of this necrosis, and from the clinical standpoint, as to the best treatment to adopt in marked toxæmia when suppression of urine is threatening.

The Society is under a deep debt of gratitude to Dr Eardley Holland of London, who came north at my invitation to read before us a paper on "Cranial Stress in the Fœtus during Labour." This was at once a deeply interesting clinical communication and one of high scientific value, and forms with its beautiful illustrations an outstanding feature of the XLth Volume of our *Transactions*. It included an elaborate enquiry into the mechanics of cranial stress and strain consequent on the moulding of the fœtal head, and a most interesting account of the part played by the periosteal layer of the

dura mater and its various septa in withstanding the effects of excessive stress during labour, together with an analysis of the morbid anatomy of tears of these septa as found in 81 fœtuses out of 168 examined which had died during birth. The clinical analysis of these 81 cases revealed some most significant facts not previously known or suspected, while their bearing on the management of labour, especially in breech presentations, cannot fail to be of the utmost importance. The published paper will amply repay the most careful study.

We are honoured now in having Dr Holland enrolled as one of our Fellows, and he is assured of a very hearty welcome when next he addresses us, which I trust will be at no distant date.

Dr Robertson Dobie of Crieff read us a paper on "A Rare Case of Pregnancy and Labour in a Double Uterus," which had occurred in the course of his practice, and which illustrated very well the difficulties which the general practitioner may encounter and has to tackle unaided. Such clinical records from those of our Fellows who are general practitioners are always highly appreciated by us. The primary object in the foundation of our Society was to afford opportunity for the recording of such interesting and obscure cases. Indeed it is so stated in the first of the Laws which govern our proceedings, where we read: "It is expected that the Fellows will communicate any interesting cases and exhibit to the Society any important morbid specimens which may come under their notice." I am sure the usefulness of our Society and the interest of its proceedings would be greatly increased if this rule was more frequently honoured in its observance.

We listened with great interest when Dr Horace Philip recorded some of his obstetric experiences among a primitive tribe in Central Africa, his communication recalling to our minds papers by Dr Felkin read before our Society many years ago.

Dr Johnstone and Dr F. J. Browne recorded in a short paper an unusual Case of Double Congenital Hydronephrosis, and Dr Johnstone read notes on "A Case of Concealed Accidental Hæmorrhage, associated with Eclampsia," which had come under our conjoint care in the Maternity Hospital.

Pelvimetry as an Index of Treatment in Contracted Pelves was the subject of an important and highly practical communication by Dr David Shannon. Speaking from a wide experience

of pelvic deformity gained in connection with his work in the Maternity Hospital, Glasgow, Dr Shannon indicated the fallacies of the ordinary methods of pelvimetry, and emphasised the importance of ascertaining the relation between the size of the fœtal head and the pelvic canal in each individual case. The various methods of doing this according to the rules laid down by Müller, Pinard, and Munro-Kerr, were described and criticised in detail. A subject of such practical importance and interest to every obstetrician was followed by an exceedingly instructive discussion.

At our February meeting this year we had a most valuable and memorable contribution from Dr Haultain on his experience of the Conduct of Labour under "Twilight Sleep," with Special Reference to its Use in Private Practice. One of the first in this country to adopt this method of anæsthesia in labour, Haultain did much by his writings to popularise its use and lead to its now wide employment in suitable cases. It was a subject very dear to his heart, and one on which he always spoke with the greatest enthusiasm. In this, his last paper read before us, his strong advocacy of its use in private practice, drawn from an experience of 150 cases where he had employed it with uniformly successful results to both mother and child, his pertinent criticism of the varied objections that have been raised against it, and the detailed and simple rules he laid down for its employment, were alike most convincing and instructive.

The paper was one of his most characteristic productions, delivered in his own breezy and jaunty style, and couched in that terse and forcible language of which he was such a master. It was a fitting conclusion to his many valuable contributions to Obstetrical and Gynæcological literature, and to his distinguished career as one of the most brilliant and beloved Fellows of our Society.

From one of our Junior Fellows, Dr Douglas A. Miller, we had a paper on "A Case of Placenta Prævia, associated with Post-partum Eclampsia." Dr Miller's paper opened up a new field of investigation, and was of special interest in that it confirmed the theory so ably advocated by Dr James Young, that the source of the toxin in eclampsia is to be found in necrosis of the villi following separation of the placenta. We all hope that this, Dr Miller's maiden contribution, is but the forerunner of many similar scientific papers, which we shall have the pleasure of hearing from him in the future.

To the gynæcologist, no class of case is of greater importance, and comes more frequently under his care than that of Prolapse of the Uterus. We listened accordingly with much pleasure to a paper by such an authority as Dr S. Cameron of Glasgow, on the surgical treatment of this condition, and his advocacy of the operation of interposition of the uterus, as it has been called, for its cure. The value of this operation has been much debated. In Dr Cameron it has an enthusiastic advocate, and his plea for its more general adoption was certainly most ably put before us. This was the third paper communicated to us by Fellows of our Society resident in Glasgow, and I am sure I am expressing the feelings of every one of us, when I say we deeply appreciate their visits, and very cordially welcome their communications.

How great is the wastage of fœtal life, and the large extent to which this is due to preventable causes, was very vividly brought to our notice in a paper on "Still-Birth: its Causes, Pathology, and Prevention" by Dr F. J. Browne. This very important contribution consisted of an analysis of the post-mortem findings in 200 consecutive cases of still-birth and neonatal death occurring in our Maternity Hospital practice during a period of only fifteen months—a wastage of fœtal life which is indeed staggering, even allowing for the very large proportion of abnormal cases which naturally find their way into such an institution. The wide scope of Dr Browne's elaborate investigations and its practical value can best be gathered by a quotation from the paper itself. "In every case," he says, "an effort has been made to co-ordinate the post-mortem findings with the clinical history of the parents, and of the labour; and from the results of this co-ordinated enquiry such practical conclusions have been drawn with regard to the supervision of pregnancy, conduct of labour, and care of the newly-born infant as seemed to be warranted by them."

A piece of more careful, thorough and valuable work has rarely been submitted to us. For this, and for its important practical bearing on obstetric practice, we, as a Society, and the profession at large, are under a deep debt of gratitude to the author.

The Medical Research Council, under whom the investigation was conducted, is to be congratulated on having a research scholar of such brilliant gifts and originality.

The problem of Cancer, in spite of a vast amount of clinical

research, and experiments on the lower animals, still remains unsolved. No theory is more attractive than that of its parasitic origin, and several widely different forms of organism have from time to time been isolated from cancerous tissue by investigators working along this line. In every case so far, however, the organism so isolated has failed to stand the etiological test as laid down by Koch, so that now the parasitic theory may be said to have been abandoned. We listened, therefore, with the very greatest interest to an exceedingly able paper from Dr James Young on this subject, entitled "Description of the Life Cycle of an Organism obtained by Cultivation from Carcinomatous Tumours." The communication, we all felt, represented an enormous amount of hard work, and prolonged and most careful observation. According to Dr Young, the yeast-like organism which he has isolated from cancerous tissue passes in its life cycle through several distinct stages, in which it assumes markedly different forms. This is, in itself, of extreme interest, as, if Dr Young is correct, it affords a possible explanation of the widely divergent forms of organism that have been described by other observers.

Dr Young suggests further that it is only infective in its earliest or granular stage, a stage so minute as only to be recognised under the highest power of the microscope, and that this stage is passed in the nucleus of the infected cell, and is the stimulus which accounts for the wild and uncontrolled development of cancer cells outside the limits of cell proliferation in healthy tissue.

The paper was only in the nature of a preliminary communication, but if further investigation enables Dr Young to verify his conclusions, the importance of his discovery cannot be overestimated. We cannot hope for much further progress in the prevention and cure of this dread disease, by operation or therapeutic measures, until its cause is definitely ascertained.

The high scientific value of Dr Young's previous researches in connection with the source of the toxins in Eclampsia will, I am sure we all trust, be excelled by the results of his present, and so far most striking, investigation. The Society awaits with interest the results of his further research on this all-important subject.

Several of these papers illustrate very well the tendency of modern medicine in all its departments to concern itself more with the prevention than the cure of disease.

In the department of Obstetrics this great principle of Prevention has not been lost sight of and much has been accomplished, but it must surely have a wider application than exists at present. In spite of the great improvement in Medical and Surgical practice it is a reproach to our department that the maternal mortality in childbirth has shown little or no improvement since 1894, and indeed has actually increased during the past two years. The still-birth rate is still very high—about 3 per cent. of live births—and while the infant mortality (*i.e.* those dying under one year after birth) has fallen from 156 per 1000 in the decade 1896-1916 to 80 per 1000 in 1920, the death-rate during the first month, when it may be presumed the infant is more directly under the obstetrician's care, has not much diminished. As may be gathered from some of the papers I have referred to, there can be no doubt that a very substantial proportion of these maternal and infant deaths are due to preventable causes. A serious responsibility, therefore, rests with the obstetrician—teacher and practitioner alike—for the solution of this grave situation is mainly dependent on improved midwifery practice. This responsibility must be recognised and squarely faced.

Much is to be hoped for from the operation of the Maternity and Child Welfare Act of 1918. Under this Act Local Authorities may make such arrangements as may be sanctioned by the Ministry of Health for attending to the health of expectant and nursing mothers, and children who have not attained the age of five years. Such arrangements exist now in most of our larger towns, under which provision is made for, among other things, antenatal care and nutrition of the mother, an adequate medical, midwifery and nursing service for childbirth, and Maternity Centres for antenatal and post-natal supervision.

Such measures cannot fail to have very important and far-reaching results, if they are fully taken advantage of, and it rests very largely with the profession to see that this is done. Further, I think that the community can only reap the fullest benefit if attendance at these cliniques is made a compulsory part of the training of all graduates in medicine.

A practical knowledge of the hygiene and management of Pregnancy, and of its diseases and complications, the skill necessary for accurate diagnosis of abnormal presentation and position and of pelvic deformity, can only be acquired

at such cliniques where a very large number of women are attending.

As things are at present, owing to the limited number of indoor patients in our Maternity Hospitals as compared with the number of students, such knowledge, so vitally important in connection with this question of high maternal and fœtal mortality in childbirth, is only gained in very many cases by painful experience, or never gained at all.

But I must pass on. Prevention in Obstetrics and Gynæcology is a fascinating subject, and I at one time thought of making it the theme of my address to you to-night. I felt, however, that there was one, and one only, among us who could do it full justice, our esteemed friend Dr J. W. Ballantyne. To him I leave it, with our united very cordial congratulations on the successful outcome of all his pioneer work on behalf of the unborn child and the expectant mother.

It will be remembered that some time ago we were invited to support a movement for the holding of an Annual Congress of British Gynæcologists and Obstetricians This, naturally, met with our cordial approval and materialised in the first Congress of British Obstetricians and Gynæcologists, held in Birmingham on 3rd and 4th June of this year. The Congress was attended by representatives from the Royal Society of Medicine, Midland Obstetrical and Gynæcological Society, North of England Obstetrical and Gynæcological Society, the Glasgow Obstetrical and Gynæcological Society, and our own Society, and was an unqualified success. We are deeply indebted to Dr F. J. Browne for so ably representing us on this occasion. His paper on "Syphilis in the New Born" formed an outstanding feature of the proceedings and was received with many marks of appreciation. The next Congress is to be held in Liverpool in the early summer, at which I very earnestly hope our Society will be more fully represented than was possible this year.

I had the honour, as your President, of being present at the Dinner given recently in celebration of the Centenary of the Edinburgh Medico-Chirurgical Society. The most cordial relations have always existed between our two Societies, and we very warmly welcome this opportunity of congratulating our elder sister on this interesting event in her history, and extending to her at the same time our best wishes for her continued prosperity.

I cannot, as your retiring President, bid you farewell without thanking, in your name and on my own account, the various officials on whom the welfare and success of our Society so very largely depends.

I have been very fortunate in having two such loyal and energetic Secretaries as Dr R. W. Johnstone and Dr Hugh Davidson, and I gladly avail myself of this opportunity of acknowledging and thanking them for the assistance they have given me in the conduct of my own duties, and for the highly efficient manner in which they have discharged the routine work that falls to their care.

To our retiring Treasurer, Professor M'Gibbon, we are under a very deep obligation for his devoted service. I fear that few among us realise the onerous character of the duties of the Treasurer of such a Society as ours, where our Fellows are scattered, I may say, all over the world. These duties Professor M'Gibbon has discharged with conspicuous success, and I can pay him no higher compliment than by saying he has worthily maintained the high traditions of the office so long associated with the name of Dr Wm. Craig.

While we are all sorry Professor M'Gibbon is leaving us we congratulate him very heartily on his appointment as Professor of Obstetrics in Johannesburg. I can assure him, he leaves behind him only the happiest of memories and takes with him our very best wishes for his health, prosperity and success in the new and important sphere of work to which he has been called.

To Dr James Young, who has acted as Editor of our *Transactions* since 1912, we are no less indebted, and we acknowledge with grateful thanks the time and labour he has devoted to our interests. Under the new scheme for the publication of our *Transactions* our Editor will have no less arduous duties, and we are fortunate in having as Dr Young's successor one so well qualified for the post as Dr F. J. Browne.

It only remains for me, before demitting the office to which I had the honour of being elected two years ago, to thank you once again for your kindness and for your generous forbearance with my many shortcomings. I shall resume my place among you as an ordinary Fellow with a stimulated enthusiasm and renewed interest in all that concerns the welfare of our Society.

On the 1st of November 1889, two somewhat inexperienced and certainly very nervous graduates commenced their obstetrical careers, as House Surgeons to the late Professor Sir

Alexander Simpson in the Edinburgh Royal Maternity Hospital. An acquaintanceship formed then was cemented into a warm friendship during the succeeding three months, and has continued unimpaired and unbroken up to the present time. As one of those two youthful obstetricians, I very cordially welcome as my successor my fellow Resident of thirty-two years ago, and my much esteemed friend of to-day, Dr James Lamond Lackie.

To him I now hand over the duties, responsibilities and privileges of the President of the Edinburgh Obstetrical Society, in the full assurance that he will maintain in a manner far better than I have been able to do the high traditions of this honoured and important position.

In moving a vote of thanks to Dr Fordyce, Dr Haig Ferguson said that, in the absence of Dr Ballantyne, he had great pleasure in moving a hearty vote of thanks to the retiring President, both for his address and his two years of office. He drew special attention to Dr Fordyce's remarks on the Medico-Chirurgical Society, and suggested that a message of congratulation should be sent from the Edinburgh Obstetrical Society to their sister body on the anniversary of her centenary.

Dr Barbour seconded the vote of thanks to Dr Fordyce, and also the proposal that the congratulations of the Society should be sent to the Medico-Chirurgical Society.

PRIVATE BUSINESS.

Annual Financial Statement.—The Financial Statement was presented, and was approved.

The Treasurer referred in eulogistic terms to the services rendered by the retiring Treasurer, Professor M'Gibbon, who, even in the midst of his preparations for leaving for South Africa to take up the duties of the Chair of Obstetrics and Gynæcology in Johannesburg, had spared no pains in order to leave the financial affairs of the Society in a satisfactory condition. The Society was under a deep obligation to Professor M'Gibbon for the way in which he had carried out his duties during his term of office.

Dr Lamond Lackie, the newly appointed President, moved a vote of thanks to Dr R. W. Johnstone for the splendid work which he

had done as Senior Secretary, and to Dr James Young as Editor of the *Transactions.*

A Report was made by the Council on the Referendum regarding the future publication of the *Transactions*, and a motion made by the President on behalf of the Council — "That the Society agrees to adopt the proposal as to the publication of the *Transactions* in the *Edinburgh Medical Journal* described in the Memorandum issued to all Fellows in July 1921; and instructs the Council to take such steps as may be necessary to give effect thereto," was unanimously adopted.

PNEUMOPERITONEUM OF THE PELVIS AS AN AID TO GYNÆCOLOGICAL DIAGNOSIS.*

By R. LANCE IMPEY, M.C., M.D., F.R.C.S. (Edin.).

THROUGH the courtesy of Professor Cabot, Dean of the Faculty of Medicine, Dr Reuben Peterson, Professor of Gynæcology and Obstetrics, and Dr J. G. Van Zwaluwenburg, Professor of Roentgenology, all of Michigan University, Ann Arbor, U.S.A., in the summer of this year I was given an opportunity of spending three months investigating the work being carried out in the Gynæcological Department at Michigan University Hospital on Pneumoperitoneum of the Pelvis, and I feel that I owe much to my American colleagues, who have enabled me to be the first to report in this country on their work on the X-rays as an aid to more accurate gynæcological diagnosis.

Drs Peterson and Van Zwaluwenburg have published several papers on their work, and in order to bring these before your notice it is my object to-night to summarise what they have written, and to illustrate with lantern slides the results of their work. I shall explain in some detail their technique with a view to enabling any who may be so inclined to investigate on the same lines.

It was shown by Weber in 1912 that after the inflation of the abdominal cavity, X-ray photographs are of diagnostic use. Since that date extensive work has been carried out by Stein and Stewart, who have shown that the introduction of air or gas into the peritoneal cavity is a safe and useful diagnostic procedure. Rubin, in his investigations on sterility, has demonstrated how the patency of the Fallopian tubes may be determined by passing gas into the abdomen through the uterus.

In 1920 Drs Peterson and Van Zwaluwenburg, impressed by the facts published of the two methods of gas inflation, trans-peritoneal and trans-uterine, decided that the combination of the two might prove of use in gynæcological diagnosis. Since that date a great deal of experimental work has been carried out on these lines at the Michigan University Hospital.

It should be noted at the outset that this work cannot be carried out by the gynæcologist alone. It is essential that he should co-operate with an expert radiologist. The gynæcologist is not often called upon to use the X-ray, and without experience

* Read 14th December 1921.

is not competent to interpret what may be valuable illustrations of lesions that he could, by bi-manual examination, readily make out.

In the past the X-rays have not been used more frequently for gynæcological diagnosis because of the fact that the pelvic organs are obscured by the shadows cast by the bowel and omentum. This difficulty may be overcome by the introduction of gas into the peritoneal cavity, and by the influence of gravity. It is important to realise, however, that the X-ray photograph taken after the introduction of gas reveals only those organs with which the gas comes in contact.

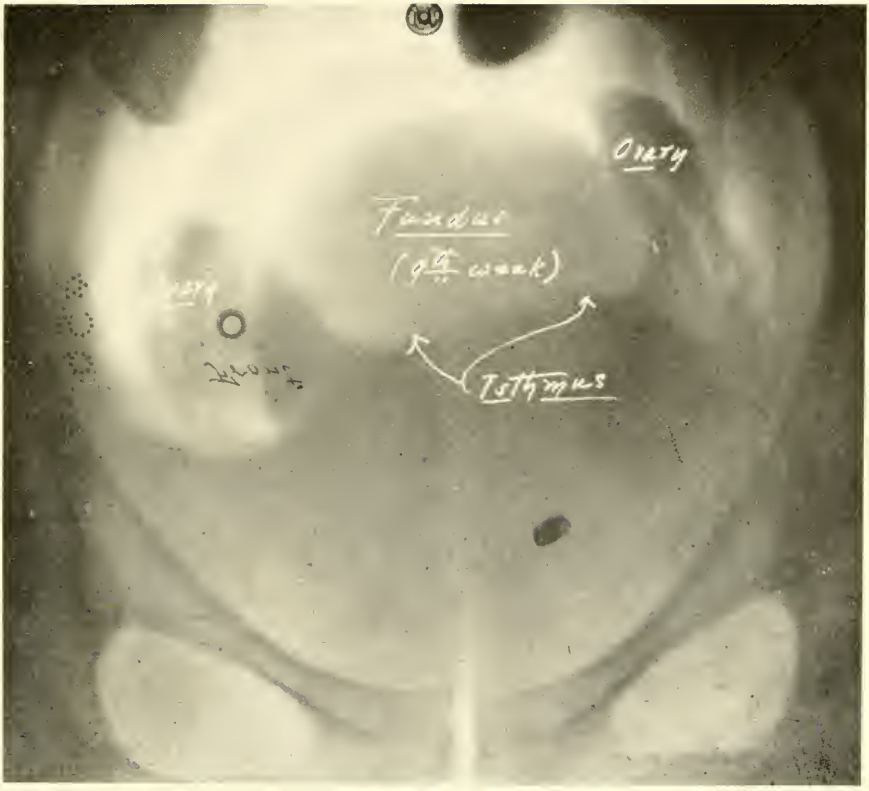
What one actually sees in the X-ray photograph is the gas bubble; the pelvic organs being shown only in so far as the gas is replaced by them. It follows from this that unless the organs which we propose to study can be thrown into such a position that they are clearly outlined by the contiguous gas, they will not be recognised, and only such surfaces as are in contact with the gas will be apparent. It also follows that all unnecessary structures must be removed from the pelvis.

With this object in view, the bladder and pelvic colon should be emptied, and the more mobile bowel, which usually occupies the pelvis, as well as the omentum, must be displaced.

This desired effect is obtained if, after the introduction of the gas, the patient is placed in a modified knee-chest position. The gas rises to the highest level of the cavity and displaces the omentum and movable bowel which, aided by gravity, falls forward into the abdominal cavity. With the pelvis freed of these unnecessary shadow-forming factors an X-ray photograph will show very clearly all the pelvic organs.

Apparatus.—In developing their technique an attempt has been made to produce a method that is safe, simple, and cheap, and one that can be carried out in any up-to-date hospital. No expensive or elaborate apparatus is necessary. The table used is an ordinary operating table, which can be lowered at the one end. The carbon dioxide is stored in an ordinary commercial cylinder. It is evident that before passing the gas from this cylinder into the abdomen or pelvis, it is necessary to regulate the pressure of the gas as it issues from the tank. This is made simple by the use of a gas pressure valve, by means of which the flow of gas from the cylinder can be easily controlled.

It is also essential that the amount injected may be



NORMAL PREGNANCY—NINTH WEEK

accurately measured, and that the pressure under which it passes into the patient may be easily gauged.

The apparatus for measuring the gas is an inverted syphon pulsating meter commonly used by engineers for the measurement of chlorine gas.

With the apparatus connected with the gas tank it is only necessary to count the number of pulsations in the syphon to determine the amount of gas which is flowing through the cannula. A manometer is used to indicate the pressure under which the gas is passing into the patient.

For the trans-uterine route a metal uterine cannula, perforated at the tip, is used. To this is attached a rubber obturator which fits into the external os, and prevents the escape of the gas backwards into the vagina.

It is essential to test the permeability of the cannula before its introduction into the cervix. Any blockage in the instrument will be shown by a quick rise of the manometer index. Failure to observe this practice for both the cannula and lumbar puncture needle may lead to wrong deductions. The lumbar puncture needle is used to perforate the abdomen when the gas is passed through the abdominal wall. It is hardly necessary to say that before use all instruments necessary for gas inflation should be sterilised.

The abdominal wall, or if the trans-uterine route be used, the cervix and vagina, are prepared by the free use of iodine. Rubber gloves, sterile towels, etc., are employed just as for any surgical operation.

Numerous bacteriological tests have been made to determine whether the carbon dioxide gas supplied in ordinary tanks contains bacteria or not. In every instance the cultures showed no growths.

It was also ascertained that the temperature of the gas as it enters the abdominal cavity is that of the room, and therefore unlikely to give rise to peritoneal irritation.

Carbon dioxide is now used in preference to oxygen. Oxygen is slowly absorbed, with the result that the patient remains distended and distressed for days. On the other hand, when carbon dioxide is used, though the discomfort in proportion to the amount used is as great as with oxygen, the distress is temporary, the gas being absorbed in fifteen to thirty minutes.

Patients are able to leave the hospital half an hour after

the inflation. This quick absorption is, in one respect, a disadvantage, in that it makes it necessary that the X-ray picture be taken at once. Any delay may mean failure. For this reason a Coolidge portable X-ray apparatus operating on the ordinary lamp circuit is used.

Technique.—As the main object of this work on pneumoperitoneum has been to improve pre-operation diagnosis, the technique has been carried out on practically all cases, unless an acute inflammatory disease was present, or other general contra-indication.

After a complete history has been taken, the patient is subjected to a most careful and painstaking bi-manual examination, and the exact findings recorded. Wherever possible a clinical diagnosis is arrived at, and also noted.

In all cases, unless there are definite contra-indications, the first attempt is made to pass the gas by the trans-uterine method. If conditions such as an acute cervicitis, profuse purulent and bloody uterine discharge, or pregnancy be present, the gas is passed through the abdominal wall.

The patient is placed in the Sims position, as this gives better access than the lithotomy. A Sims speculum is introduced and the cervix and vaginal walls swabbed with iodine. The anterior lip of the cervix is seized by a volsellum and the position of the body of the uterus ascertained by means of a sound. Care is taken to remove all secretion from the cervical canal. The uterine cannula is next passed into the uterus, the rubber obturator being pressed into the canal until a snug fit is secured.

The apparatus having been previously set, by means of the gas pressure valve to six or eight pulsations a minute, the gas now starts to pass into the uterus. As the gasometer measures 25 c.c. of gas to each pulsation, set at this rate, 125 to 200 c.c. will pass per minute. It has been found by experiment that to get the best results, 1000 c.c. of gas should be injected.

If, when the gas begins to flow through the cannula, one or both tubes are permeable, there will be a rapid rise of the manometer to about 100. If the gas passes through the tubes into the peritoneal cavity the pressure drops to about 30, and remains around that figure. If, on the other hand, there is resistance to the flow of gas through the tubes, the pressure will continue to rise steadily. It has been found that it is not advisable to allow the pressure to go above 200. It is the

custom to make five or six attempts at passing the gas through the tubes, never allowing the manometer reading to go above 200. In some cases the gas passes at a moderately low pressure at the fourth or fifth attempt. This fact suggests the possibility of being able to cure certain cases of sterility by forcing open the tubes with a low pressure of gas.

If it is found that the gas will not pass through the tubes, it is injected through the abdominal wall by the following technique. The skin of the abdominal wall from the umbilicus down to pubes, and for a width of several inches, is painted with iodine. Unless there be any suggestion of adherent intestines, or a tumour beneath this site, the point of election for the puncture is in the mid-line about 2 inches below the umbilicus. A fold of abdominal wall is grasped with the left hand and held tense. The lumbar puncture needle is passed through this fold in a slightly upward direction. The needle is passed until it meets the resistance of the fascia. It is then thrust downwards through the fascia and peritoneum, a little experience giving accurate information as to when the peritoneum has been pierced.

The stylet is then withdrawn from the needle and the latter connected with the rubber tube leading from the syphon meter. By watching the manometer it can be recognised at once whether the gas is flowing freely into the peritoneal cavity, or being forced into the subcutaneous tissue. In the latter case the pressure continues to rise steadily. If the peritoneum has been penetrated the pressure rises at first 15 to 20 degrees but soon falls almost to zero.

When approximately 1000 c.c. of gas have been injected, either by the trans-uterine route, or through the abdominal wall, the patient is placed face downwards in the knee-chest position on the tilting table. In order to relieve the pressure on the abdomen and allow the bowels to fall back into the abdominal cavity and away from the field of observation an inclined board is used with the upper border cut away to fit the pendulous abdomen. This board gives support to the thighs just outside the anterior superior spine. An 18-inch square of opaque fabric with a 6-inch circular hole cut out of its centre is laid on the buttocks and serves as a diaphragm. The plate is next placed in a case beneath the patient and the table is tilted forward to an angle of 20 degrees. The patient is prevented from slipping by means of shoulder straps.

It may be advisable at this juncture to explain the object of this position of the patient. The uterus is a free body except at its lowest end, where it is fixed to the floor of the pelvis. If this point of fixation can be brought to the highest point in the gas bubble filling the inverted pelvis, the fundus will hang freely suspended, and in the vertical position, and a vertical ray will project it in its long axis. This free suspension depends on the inclination of the patient, and the best inclination has been found to be 20 degrees from the horizontal, with the head lower than the feet. If the inclination is less than this the uterus will not swing free from the bladder, and the differentiation of its anterior surface will be imperfect. If, on the other hand, it is greater than this, it falls too far back into the posterior cul-de-sac and narrows this space. It is only by studying stereoscopic images that the relative positions of the different structures can be made out. Stereograms are taken as a routine. The first of the two stereos is taken with the tube vertically above the hypothetical position of the uterus, so that it will be projected with the vertical ray in its long axis.

For the second exposure the tube is moved towards the feet a distance of $2\frac{1}{2}$ ins. Care is taken that the projection in both instances is in the sagittal plane of the body. An exposure of from fourteen to twenty seconds is required. Usually it is advisable to interrupt this to enable the patient to breathe.

The plates are then taken to the X-ray laboratory to be developed and interpreted by Dr Van Zwaluwenburg, without any note of the clinical findings being given to him.

It was a matter of great interest to see that in a number of cases, after studying the stereoscopic plates, it was possible to describe with greater detail the actual pathological findings than after a bimanual examination.

It is not the object of this paper to give an exposition of the significance of the shadows seen in these plates. My intention is merely to demonstrate that it is possible, by following the technique I have described, to show by X-ray photographs any pathological changes in the pelvis. I shall, however, mention some of the conclusions tentatively reached by Dr Van Zwaluwenburg after a study of a number of cases.

The uterus will show two cross sections. The one representing the body, and the other the supra-cervical portion or isthmus.

Pneumoperitoneum of the Pelvis

The fundus of the uterus is separated from the bladder by the utero-vesical pouch, which normally contains gas.

If the pelvic floor be markedly relaxed the uterus may lie on the posterior surface of the bladder, and be difficult to recognise.

The broad ligament hangs nearly vertical, and presents its thin edge to the ray, and is clearly shown.

The normal tubes lie in the free margin of the broad ligament, and their shadow is normally a part of that structure.

Ovarian shadows depend upon whether the ovaries present their surfaces or their edges to the rays.

The bladder is prominent only in proportion to its degree of distension.

The rectum is always seen as a cylindrical shadow along the hollow of the sacrum.

The anterior position of the picture is occupied by the shadows representing the floor of the pelvis.

With a knowledge of the appearance of the shadows cast by the normal pelvic organs, it is not difficult to recognise any change in their size or shape.

The most characteristic picture is of a chronic bilateral salpingitis. Here one finds the utero-vesical pouch unusually wide, and the posterior portion of the pelvis occupied by a large dense mass, of which the central part is obviously the fundus of the uterus.

Ovarian cysts produce a picture that will rarely leave one in doubt.

Fibroids of the uterus show an irregular outline and the mass has a greater density than normal.

It was extremely interesting to realise that without any clinical history being known, Dr Van Zwaluwenburg was able to recognise the signs of pregnancy as early as the fifth or sixth week. These signs consist in the enlargement laterally and a flattening in the antero-posterior direction of the isthmus. This probably is due to the increase in the blood supply to the uterus, and the early softening of the lower uterine segment The isthmus is clearly and smoothly outlined, and extends well out into the broad ligaments. The uterus itself is also enlarged, but its density is somewhat less than normal. The shadow is entirely homogeneous and its outline is uniformly smoothly rounded, giving the impression of an elastic bag partly filled with fluid.

The only other condition that throws a shadow at all similar to that of pregnancy, is a subinvoluted retroverted uterus with chronic endometritis, but in the latter condition the shadows are not homogeneous, and the impression of a soft solid mass is given, rather than that of an elastic sac containing fluid.

Anomalies of the uterus have frequently been recognised. One usually looks upon a bicornate uterus as an infrequent occurrence. Two successive cases, neither of which could be recognised bimanually, being fixed in adhesions, were demonstrated by X-ray photographs.

There may be some who, because of a vast experience, are confident of their diagnosis after a bimanual examination. These naturally will feel that pneumoperitoneum of the pelvis, though a thing of interest, is not of much value to the profession. On the other hand, there are probably those among the younger gynæcologists, who, after having gone with great care into a case, would give anything for a "peep into the abdomen" before advising operation. This procedure, in my opinion, gives this opportunity, and the diagnosis may be confirmed, or proved to be wrong, by an X-ray picture. For this reason I recommend that it should be given a trial.

There was a time when the surgeon was indignant when it was suggested that an X-ray photograph may throw further light on the diagnosis of a simple fracture. To-day it is the rule to X-ray all fractures, whether the diagnosis be straightforward or not.

Any new method of diagnosis must meet with certain requirements before it is generally accepted. It must be safe, simple, and cheap. My first impressions of this technique were that it was not free from danger. I was informed, however, that experimental work had been carried out on animals, and it was found that it was almost impossible to pass a lumbar puncture needle into a bowel that was not fixed. As soon as the point of the needle touched the bowel, instead of piercing it, it pushed it to one side.

More valuable evidence than this is the fact that, at the time of my departure, over 300 cases had been inflated either through the abdominal wall or through the cervix; and in spite of detailed notes, which are characteristic of American hospitals, there is no record of the slightest damage having been caused.

The simplicity of the technique is demonstrated by the

fact that it is now carried out by the junior members of the gynæcological staff.

The only expensive apparatus needed is the portable X-ray, and as it is work that should only be attempted by specialists in hospital, this should involve no extra expenditure.

In my opinion, the greatest disadvantage is the discomfort caused by the rapid distension of the peritoneal cavity. However, with further experience and improved methods I have no doubt that this will be reduced to a minimum.

Value of Procedure.—It is not suggested that this procedure should be adopted in all cases. In the type of cases where it is apparent that the abdomen should be opened nothing is gained, but in the larger class of cases when a diagnosis is uncertain it should prove of great value. It is particularly useful in cases of young unmarried girls, or highly strung nervous women, when a bimanual examination is not advisable, or sometimes impossible to make. Then, with an X-ray photograph one is able to state definitely whether any pathological condition be present or not. The following is the history of diagnosis that was missed until an X-ray was taken :—

Patient aged 22. Complaint—Sterility and pain in right iliac fossa. Had been married four years, but was never pregnant. For two years had occasional attacks of pain in her right side. No vomiting. Periods regular. On abdominal examination no areas of tenderness were noted.

Pelvic Examination.—Conical cervix, pointing in axis of the vagina. Uterus small, acutely ante-flexed and movable. Left ovary not enlarged Right ovary movable, but lower in pelvis than the left.

It was found impossible to pass gas into the abdomen by the trans-uterine route. 1000 c.c. of gas were passed in through the abdominal wall, and an X-ray photograph taken.

Report of Radiologist.—All the shadows of the pelvis are found on the posterior half, which is one confused mass, relieved here and there by an occasional gas bubble. This shows the presence of intestinal coils in the pouch of Douglas. The anterior fossa is entirely empty. The broad ligament shadows are unusually dense and wide, and appear to be displaced backwards by traction.

Diagnosis.—Bilateral salpingitis. After this diagnosis was given by the radiologist the patient was re-examined, but no evidence of the salpingitis could be felt. It was decided to open the abdomen, and both tubes were found to be slightly enlarged and were covered with miliary tubercle. These tubes were soft and pliable, and gave no

resistance to the examining finger. Had it not been for the X-rays, this case could not have been diagnosed.

I do not wish to lay too much stress upon the possibility of being able to recognise pregnancy at six weeks, but can assure you that those of us who were working in the Gynæcological Department at Ann Arbor felt that if a diagnosis of pregnancy was given by Dr Van Zwaluwenburg after seeing the X-ray plates of a case whose history he was ignorant of, we could with confidence inform the patient of his conclusions. Up to the present the diagnosis has always been proved to be correct.

In cases of sterility, the information gained as to whether the tubes are patent or not is of practical value.

Conclusions.—1. X-ray plates showing all the pelvic organs may be obtained after inflating the peritoneal cavity with 1000 c.c. of gas and placing the patient in a modified knee-chest position.

2. Any pathological changes in the pelvic organs are clearly seen in these X-ray plates.

3. In a large group of cases, when the bimanual examination is unsatisfactory, the information gained from these photographs is valuable in deciding whether operation is necessary or not.

4. It is probable that by this method pregnancy can be diagnosed as early as the sixth week.

5. As far as can be ascertained after a study of 300 cases the method is free from danger.

6. The technique is simple, and no expensive apparatus is required.

REFERENCES.—[1] "Pneumoperitoneum of Pelvis," *American Journal of Roentgenology*, October 1921. [2] "Experiences with Pneumoperitoneal X-ray as an Aid to Gynecological Diagnosis," read before Minnesota Medical Association, November 1920. [3] "The X-rays after the Inflation of the Pelvic Cavity with CO_2 as an Aid to Obstetric and Gynecologic Diagnosis," *Surgery, Gynecology, and Obstetrics*, August 1921. [4] "Pneumoperitoneum and Roentgenology as Aids to more Accurate Obstetric and Gynecologic Diagnosis," *American Journal of Obstetrics and Gynecology*, November 1921.

DISCUSSION.

Dr Barbour congratulated Dr Impey on having so soon after graduation gone to see what is being done in America, and on having returned to report to the Society the results of his investigation. It was a matter of particular note that in the posture recommended for

pneumoperitoneum of the pelvis the intestines fall down and get out of the way of the uterus, as the chief difficulty in X-raying the pelvic organs has always been the shadow of the intestines. The following points might give grounds for controversy:—The use of the word "consistence." By consistence one thinks of the difference between a soft uterus and a hard one. The appearance the isthmus presents in early pregnancy was somewhat darker. Now one would have thought that if the body of the isthmus were softer, it would not have stood out so clearly. What is the advantage of recognising pregnancy as early as the sixth week? Is it not better merely to keep the patient under observation until pregnancy can be diagnosed in a manner much simpler and less distressing to the patient? It would, however, be of great advantage in examining the Fallopian tubes.

Dr Ballantyne said that this was a new method of examining to most of those present and they were grateful to Dr Impey. He asked with regard to the comfort of the patient, if morphia, which had been suggested, would not interfere with some of the conditions of the organs. With regard to pregnancy have we been wrong about the lower uterine segment? Has that been concealed from us by its softness? Sight in this case would be safer than palpation. He was glad to hear the comparison between this method and bi-manual examination, and that after all it would rather be a means of giving us greater tactile expertness, and would never supersede bi-manual examination, particularly where patients were not very facile. He prophesied that later publications would show some of the disadvantages of pneumoperitoneum. We all know how very satisfactory all these new methods are at the beginning, and then we begin to get critical papers published. He asked whether this method has any therapeutic value, as in tubercular peritonitis or in cardiac and respiratory conditions; and is there not danger of puncturing the tubes or causing abortion by blowing up the abdomen with gas.

Mr Hartley said that he had some experience of cases with Mr Wilkie in which gas was injected into the abdomen. The technique adopted was simple, oxygen being used. There seemed very little discomfort to the patient. His opinion was that this method of diagnosis would not prove revolutionary, although in certain cases it would prove very helpful.

Dr H. S. Davidson agreed that this method would greatly help in gaining tactile expertness. The photographs would be useful when one was in doubt whether a case was appendicitis or gynæcological, and certainly it would be most beneficial in tubercular conditions which rendered the tubes very soft.

Dr G. S. Davidson drew attention to the broadening of the isthmus of the uterus on the slides. Is it really the lower uterine segment that

is broad, or is it the shadow of the dilated uterine vessels that makes it appear wider?

Dr Fordyce also spoke of the discomfort to the patient, and expressed the opinion that patients in this country would not submit to the ordeal. Where there are adhesions, however, the new method might be of the greatest value. He also referred to the dangers of distending a tube or of expelling an early fœtus. What appealed to him was that pneumoperitoneum of the pelvis would be an invaluable means of learning bi-manual examination and of teaching students, if patients could be got to submit.

Dr Haig Ferguson said that he would like to know which method Dr Impey would prefer in diagnosis—bi-manual or X-rays under present conditions.

Dr Johnstone suggested the possibility of poisoning the patient with so large an injection of carbonic acid gas. He agreed with Mr Hartley that this method would not revolutionise clinical diagnosis.

The President stated that he was specially interested to hear that there had not been a single case of accident, as he also had been struck with the possible dangers of driving pus through the tubes, and also the risk of abortion. Radiologists had told him that they had never seen a woman abort, but had seen threatened abortion. It was worthy of note that pregnancy, which had hitherto been recognisable by X-rays at the fourth or fifth month, can now be diagnosed at the sixth week. He conveyed the thanks of the Society to Dr Impey.

Dr Lance Impey in his reply said that carbonic acid gas disappeared rapidly; but it certainly did not poison the patient. He would prefer bi-manual examination, but if one could not come to a diagnosis the other method was most helpful.

The apparent breadth in the lower part of the uterus, as shown on the slide, was caused by the enlargement of the uterine vessels, which cast a shadow and made the isthmus look broad.

There is no history of peritonitis being caused by forcing pus into the peritoneal cavity. Adhesions are shown up at once when gas is injected, and in one particular case which they had not been able to diagnose, when an X-ray photograph was taken the report was at once sent back "tuberculous peritonitis." It has been found that you cannot control gas by pressing on a bag as you can with a pulsating meter. The American method is the better.

Dr Impey admitted that the discomfort to the patient was a decided drawback, and he did not think it likely that patients in this country would appreciate the method. The Americans have extraordinary faith in doctors, and will put up with any discomfort. The carbonic gas disappeared so quickly that he did not recommend morphia. He thought that it was important to be able to diagnose pregnancy early, especially in the case of unmarried people.

INVERSION OF THE UTERUS, WITH A RECORD OF FOUR CASES.*

By JAMES HAIG FERGUSON, M.D., F.R.C.S., F.R.C.P.

It has been my fortune to meet with four cases of inversion of the uterus, and as the condition is one of considerable rarity, I venture to bring them before you to-night in view of their clinical interest, and also for the consideration of the best means at our disposal for their successful treatment.

Two of the cases were of puerperal origin, and two were associated with neoplasms of the uterus. I may say that neither of the puerperal cases were of the acute variety, that is, I did not see them immediately after labour, and, I may add, I have never seen one in such circumstances.

I have already recorded one of the puerperal cases in the *Journal of Obstetrics and Gynæcology of the British Empire* of October 1906, and I shall only shortly refer to it to-night to make the series complete. The other three cases have not hitherto been recorded.

We shall first consider the two puerperal cases. In this connection it is interesting to note that they were both primiparæ, as it has been shown that most cases of puerperal inversion have occurred in primiparæ mostly under thirty. Both my cases were over thirty years of age.

Case I. (*Puerperal*).—Mrs P., primipara, æt. 31, was confined on 23rd March 1906. The labour was uneventful. Low forceps were applied for persistent O.P. The placenta came away easily in twenty minutes, there was one stitch in the perineum, and there was no hæmorrhage. She did not suckle her child. She was kept in bed for a fortnight, and resumed her usual duties at the end of the third week feeling absolutely well, and continued to feel well for three weeks thereafter. On inquiry it was elicited that the lochial discharge had never quite stopped, but was almost negligible in quantity. Six weeks after the confinement the discharge suddenly became copious, and it was thought to be the return of menstruation. As the hæmorrhage tended to increase rather than to diminish at the end of a week, she sent for her doctor, who, on examination, found the uterus was completely inverted. He and his partner endeavoured to effect reduction under an anæsthetic, but failed—the patient bleeding very freely as the result of the attempt.

I saw the patient in consultation just a little over two months from

* Read 11th January 1922.

the date of her confinement, and confirmed the diagnosis of inversion. The patient was then so sensitive that a vaginal examination was only possible under anæsthesia, and again gentle manual attempts were made to effect reduction. These were ineffectual, and were followed by free hæmorrhage, necessitating the firm packing of the vagina with iodoform gauze. The patient was removed to a nursing-home in the evening by ambulance, looking very ill and exsanguine, with a weak pulse of 100, and a temperature of 99.2° F. When the vaginal plug was renewed on the following day she again bled very freely, and the bleeding was aggravated when the uterus was touched, however gently. The whole surface of the inverted uterus was covered by ecchymosed-looking patches, and the uterus itself appeared fibrotic. As the hæmorrhage was so persistent, I determined not to delay long in operating, though I had little hope of effecting reduction in the circumstances.

I made an incision into the posterior fornix (posterior Colpotomy), and passed my finger into the inverted cup, which was found to be absolutely unyielding. I then incised the constricting ring and posterior uterine wall (after Kustner's method), but even then reduction proved to be impossible, owing, I think, to the fibrotic condition of the uterus. I then rapidly performed vaginal hysterectomy, removing the ovaries also. One ovary was cystic (as large as a plum), and the other was adherent at the neck of the funnel. The patient made a good recovery and left the nursing-home in three weeks, completely restored to health. She seemed less upset by the operation than after the previous attempts at reposition.

The interesting points in this case are :—

(1) *The Obscurity of the Etiology.*—There must have been at the end of the third stage an unrecognised and partial inversion, possibly due to a fundal implantation of the placenta with atony of the placental site, and the inversion must have gradually increased without producing symptoms during the subsequent six weeks.

(2) *The Circumstances under which the Accident occurred.*—The labour was conducted with the utmost care by two skilled and experienced practitioners, one of whom visited the patient regularly for three weeks after her confinement. There was no absolute or relative shortening of the umbilical cord which might have caused traction on the placental site.

(3) *The Insidious Fashion in which the Condition arose.*—There was nothing to indicate the onset and development of such a grave complication. The patient was performing her usual household duties feeling in the best of health, until the sixth week of the puerperium, when hæmorrhage, the first and

only symptom, showed itself, and there was never at any time any bearing down or pelvic pain.

Case II. (*Puerperal*).—Mrs S., primipara, æt. 33, was admitted under my care to Ward 36, Royal Infirmary, on 21st November 1921, with the following history:—

After a tedious labour, which began on 11th November, the patient was delivered by low forceps on Sunday, 13th November. The child was in the R.O.A. position, and weighed five pounds. The patient was somewhat exhausted, and her pulse rate was 115. The placenta was slow in separating, and after waiting for an hour considerable force was used with the left hand on the abdomen in attempts to expel it. The uterus inverted during the pressure, and the placenta appeared at the vulva, firmly adherent to the fundus uteri. Some difficulty was experienced in separating the placenta from the uterus. After it was separated, the uterus was at once and comparatively easily re-inverted manually. It was during the manipulations for reduction of the uterus that the perineum seems to have been torn. As the patient was in a condition of pretty severe shock, the tear was not repaired. The patient after this improved rapidly, but on Sunday, 20th November, seven days after delivery, while straining at stool, she suddenly felt something "give" in the lower part of the abdomen, and at the same time felt a swelling protruding from the vulva. The doctor was called in and found the uterus again inverted. He tried to reduce it under an anæsthetic, but was unable to do so, and she was then sent in to my ward in the Infirmary.

The following is the house surgeon's (Dr Hunter's) report:—

"On admission the patient was extremely weak and collapsed and was slightly 'heady,' being unable to answer questions correctly or coherently. Pulse, 138 and of low tension; temperature, 100·6° F., and respirations, 30. On removing the vulvar pad, it was seen to be stained with a yellowish-brown discharge, which was oozing from between the labia. This discharge had an offensive odour. At the vulvar orifice there was seen a smooth fleshy projecting mass, and, on separating the labia, a large pear-shaped tumour, about the size of a small melon, was exposed, and filling up the whole of the vagina (Fig. 1). A little to one side (the left) a lacerated depression was seen, apparently extending well into the muscular coat, and there were several other smaller lacerations in the mucous membrane higher up. The cervix could just be reached with the tips of the fingers, and was comparable to the constricting ring of a strangulated hernia."

I myself saw the patient about an hour after admission. She complained of a continuous gnawing pain in the vagina and frequency of micturition, and stated that she had bled continuously since her confinement, and she certainly looked like it. The perineum showed

a recent partial laceration, extending a short distance up the vagina. As the patient complained greatly of pain on examination, she was anæsthetised to permit of a thorough examination and adequate cleansing of the parts. A catheter was passed, and about 30 ounces of turbid and very ammoniacal urine were drawn off.

Gentle efforts were made to effect reduction, both bimanually and with the aid of an improvised repositor. The uterus was just like a flaccid sac, and simply wobbled about. At one point the muscular coat was deeply lacerated, apparently as far as the serous covering, and there was imminent danger of perforation occurring during the manipulations. Twice I thought I had effected partial reduction, but I am inclined to think it was more apparent than real, and the moment the upward pressure was relaxed the inversion became completely re-established.

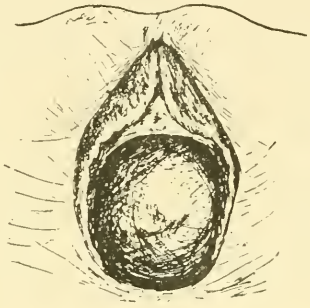


FIG. 1.—Appearance of inverted fundus uteri at vulvar orifice.

Further attempts at reduction were then abandoned. The vagina was packed firmly with iodoform gauze before sending her back to bed. Hypodermics of strychnine were given at regular intervals.

During the next three days the patient's general condition improved, the pulse and temperature falling to 115 and 99° F. respectively; the pain became less severe, and she expressed herself as feeling better.

I decided to operate by the abdominal route, and try to effect reduction of the uterus. With the assistance of Dr R. W. Johnstone, I opened the abdomen on 25th November.

The typical appearance of the cup-shaped depression presented itself at the pelvic brim, with the two ovaries lying at the lip of the cup—the left one somewhat anterior and the right more towards the back (Fig. 2).

An interesting point was that the fundus of the bladder was drawn down into the sac.

The neck of the sac was hard and rigid, and admitted with difficulty the tip of the forefinger. It was distinctly undilatable.

I then incised the posterior portion of the ring in the middle line

(by Haultain's method), and continued the incision downwards till I was able to get two fingers easily through. An assistant then pushed up the fundus with an improvised repositor in the vagina (the unaided fingers not being able to reach far enough up).

Reposition occurred gradually to begin with, with combined manipulation from above and from below, the right side of the uterus coming up first; the rest of the uterus then re-inverted itself, so to speak, somewhat suddenly, with an audible flop almost like a Jack-in-the-box movement. I then closed the posterior opening into the uterus with mattress sutures of catgut and an overlaying Lembert suture. At the same time I slightly shortened the round ligaments by folding them on themselves, to ensure the uterus being kept forwards.

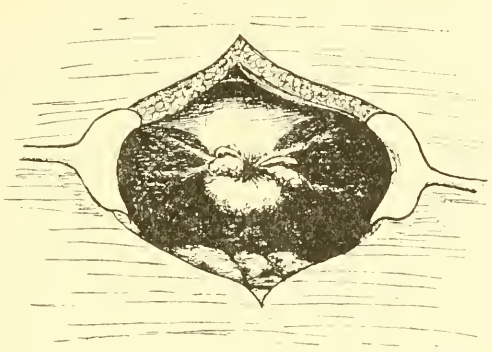


FIG. 2.—Cup-shaped depression as seen on opening the abdomen.

The patient has made an uneventful recovery, and left the ward within three weeks with the uterus in normal position.

Acute puerperal inversion is fortunately a very rare condition. It is difficult to estimate the frequency of inversion. Jardine records three cases in about 53,000 cases in the Glasgow Maternity Hospital. In the Rotunda there was one case in 100,000 labours. In Vienna no cases of inversion were noted in 250,000 confinements from 1849 to 1878.

Sir Halliday Croom tells me that in all his fifty years' experience he has never seen a single case of acute inversion.

Inversion probably occurs more frequently in private practice than in hospital, and no doubt many cases are unrecorded. For example, two cases of acute inversion have been reported to the Central Midwives Board within the last two months, where two practitioners, summoned by midwives to severe post-partum hæmorrhage, stated the uterus was inverted, and both patients

died almost immediately—in fact one was dead by the time the doctor arrived.

A considerable number of such acute cases die almost at once or within an hour of delivery from shock and hæmorrhage, and the cause of death is probably put down to post-partum hæmorrhage.

The mortality of such acute cases is great, probably fully 30 per cent., but if they survive the first shock, hæmorrhage and sepsis, the danger is not immediate.

As shock is probably the main cause of death, it follows that in dealing with such cases no prolonged attempt should be made at the time to replace the uterus. I feel sure that such attempts, even if successful, often do more harm than good. Paradoxical as it may seem, patients may die from successful reposition. The main thing is to arrest the hæmorrhage by stripping off the placenta, and then plug the vagina with sterile or iodoform gauze, while at the same time using all endeavours to mitigate the accompanying shock, which I believe is often the main cause of a fatal issue.

Miles Phillips has shown conclusively that the mere act of re-inversion produces shock, and may be the last straw in determining the death of an already collapsed patient. I would here suggest caution in the use of pituitrin in the treatment of shock in such cases as it may render the subsequent re-inversion more difficult. Once the initial dangers of shock and hæmorrhage have been combated, there is no great immediate danger to life in an inversion, though a chronic inversion certainly produces chronic invalidism, with constantly recurring attacks of hæmorrhage, pain, and possibly infection.

These facts must be clearly kept in mind in the treatment of all recent puerperal cases of inversion.

Taxis and repositors are of little use in cases where inversion has existed for any length of time, and their use is not without dangers. They may, however, be tried with all care in comparatively recent cases after the shock has passed off, always bearing in mind that if the uterus is infected or has been injured, such procedures are very dangerous and not likely to be successful.

The modern treatment of chronic inversion undoubtedly tends towards surgical interference, and the main question is whether the vaginal or abdominal route is to be preferred. I am inclined to think that if the uterus is septic, seriously

damaged by previous manipulations, or has undergone fibrotic changes, the vaginal route is indicated, especially to an operator accustomed to vaginal work, as probably in such cases reposition will be impossible, and hysterectomy will be necessary.

On the other hand, if the uterus is not seriously damaged, is not septic, and there seems a reasonable chance of effecting reposition, the abdominal route should be chosen.

In reviewing the methods of operation there is no doubt that operation by the vaginal route has up till now given the smallest mortality. Against the vaginal operation is the fact that it is more difficult, and there is less room to work in. There is, however, less shock and less chance of infection by the vaginal route. The want of sufficient room to work in can be overcome to a great extent by using Schuchardt's incision or para-vaginal section.

The following is a short note of the non-puerperal cases of inversion I have seen:—

Case III. (*Non-puerperal*).—The first was a case of a multipara, Mrs M'R., 46 years of age, who had had two children. She was sent to me in August 1915, with severe hæmorrhage, bearing-down pain, and with a swelling protruding from her vulva.

This was diagnosed as a fibroid polypus, and the suspicion was expressed at the time that there was co-existing inversion of the uterus.

On examination under an anæsthetic the uterus was found to be inverted, the tumour being attached to the fundus by a broad base. As the removal of the tumour would have left a greatly lacerated uterus, I decided, with the approval of Dr Green, the patient's doctor, to do a vaginal hysterectomy, which I did successfully—the patient making a rapid recovery, and being now in good health. Had she been a younger woman I should probably have made an attempt to save the uterus, though I feel sure that would have involved more risk to the patient.

Case IV. (*Non-puerperal*).—The second case, Mrs R., æt. 48, from Fife, was admitted to my ward in the Infirmary in June last. She has had five children, the youngest 6½ years of age.

The patient had a flooding in December 1919, for which she was sent to the Infirmary, where she was curetted, and a cervical polypus (apparently simple in nature) was removed.

On her admission in June 1921 she complained of "something coming down," frequency of micturition of two weeks' duration, and leucorrhœal discharge of a watery character and quite odourless. She last menstruated in January 1921.

On 19th June 1921 she had retention of urine, and had to be catheterised. She had been gaining in weight since January last.

On admission an irregular mass was seen projecting from the vulva, somewhat like a bunch of grapes in appearance. The tumour filled the vagina, and was apparently continuous with the cervix, and the top of the mass could not be reached by the fingers *per vaginam*. Exuding from the tumour was a considerable quantity of clear fluid not unlike urine in appearance. The tumour extended to about three fingers' breadth above the symphysis pubis, and the uterus was thought to be lying somewhat backwards.

A portion of the tumour was removed for microscopical examination, and the report was a rapidly growing fibromyoma with no definite signs of malignancy. I operated on the 29th June and removed the chief bulk of the tumour through the vagina by morcellement. I then found that the uterus was completely inverted, and straightway proceeded to remove it by vaginal hysterectomy. The patient made a good recovery and was discharged well on the 19th July.

Further microscopic sections of the tumour showed definite adeno-carcinoma.

The patient's present condition is now thoroughly satisfactory.

Her doctor writes—"11th Dec. 1921 . . . I am pleased to say Mrs R. is in the meantime looking and feeling very well. . . . She seems quite clear of her old trouble. She is doing her housework practically entirely now, although I thought myself justified in keeping her from some of the heavier parts."

A fibroid polypus is probably the commonest cause of so-called pathological inversion of non-puerperal origin, and malignant tumours associated with or causing inversion are of rare occurrence. The commonest malignant tumour associated with inversion is said to be sarcoma. Thorn collected eighty-three cases of inversions resulting from neoplasms, and found sarcoma in four and carcinoma in two. He mentions one associated with endothelioma recorded by Stark, and Stark has subsequently had another case of endothelioma associated with inversion, both of which should be included amongst the sarcomata.

So far as I know, the case which I have now described makes the third recorded case of adeno-carcinoma associated with inversion. Probably in my case it was a simple fibromyoma to begin with.

Both my cases were treated successfully by the vaginal route, which is certainly the operation of choice in the circumstances.

Discussion.

Dr Ballantyne stated that he had seen two cases, one puerperal and the other not puerperal. The first was accompanied by a fibroid tumour. The inversion and the fibroid were both in the vagina. The fibroid was removed, and the uterus replaced and the vagina packed. She ultimately died from sepsis. The second case was in the Maternity Hospital three or four years ago. The inversion had occurred after normal labour. It was one of the worst cases of puerperal sepsis he had seen, and for six weeks the patient's life hung in the balance. In the end she recovered. What had impressed him in a case of this kind was not so much the risk of shock as of sepsis.

Dr Fordyce said that he had had little personal experience of inversions, but there was one point in which he was interested, and that was the question of shock. It seemed strange that there should be so much shock in inversion of the uterus—apart from hæmorrhage—and he did not altogether agree with Dr Ferguson's advice not to proceed at once with attempts to replace. He would be inclined to take the risk of extra shock.

Dr Johnstone supported Dr Haig Ferguson's view that the danger of shock is very great if replacement of an inverted uterus is undertaken immediately. Although his experience in these cases had not been extensive, he had seen one or two which fully justified Dr Haig Ferguson's precautions. The one thing which impressed him was the shock, and he made up his mind that if he saw a case of inversion he should not attempt to replace it on the spot.

Dr Davidson was much struck by what Dr Johnstone had said as to shock, and he said that convincing evidence was to be found in the extreme shock caused to a football player by injury to the male organs.

A CASE OF CÆSAREAN SECTION IN MULTIPLE PREGNANCY.*

By WM. FORDYCE, M.D., F.R.C.P.

THE delivery of twins by Cæsarean Section must, for obvious reasons, be comparatively rare. It is not for this reason, however, that I wish to make a very brief record of the following case which recently came under my care. Its interest lies in the conditions which called for the operation.

* Read 11th January 1922.

William Fordyce

Mrs M'K., æt. 38, was admitted to the Maternity Hospital last May on account of albuminuria and severe abdominal pain, and because of the abnormal shape of the abdominal swelling. She was, according to her own statements, two weeks past her time, and for three weeks she had been unable to lie down owing to severe abdominal pain. She had been married for fourteen years and had never previously been pregnant. At the third month of her present pregnancy she had been seen by Dr Haig Ferguson in consultation with her own medical attendant, because of severe sickness and pelvic pain. These had passed off as the pregnancy advanced, but for two months before admission she had been more or less of an invalid, suffering great pain at times which was always aggravated when lying down. There had also been considerable difficulty and pain connected with micturition.

On admission to hospital the patient looked extremely ill. She could not lie on her back but sat propped up in bed, and even then was very breathless. She was emaciated and had a pinched, anxious expression. There was a small amount of albumen in the urine. Her temperature was normal; pulse 100. The abdominal swelling was so abnormal as to make me doubt if the patient was really pregnant. Its upper surface was not much higher than the umbilicus, and it extended forwards and downwards over the symphysis pubes, forming a conical tumour, the apex of which touched the patient's thighs. Fœtal parts, however, could be made out, and the fœtal heart was heard quite distinctly. The skin over the swelling was much congested and discoloured, and any attempts to move the swelling caused the patient great pain. On vaginal examination, the vagina was found to be very elongated, and the anterior lip of the cervix could with great difficulty be touched: it seemed to be lying above the promontory of the sacrum. The posterior lip and os could not be felt. The pelvis seemed to be of perfectly normal shape and size. No presenting part could be made out. Dr Johnstone, who saw the case along with me, suggested that there was probably some tumour growth of the uterus attached to the cervix dragging it upwards and keeping it fixed there, and that this was probably the cause of the abnormal expansion of the uterus in its extremely anteflexed position. This was our final diagnosis, although I was in some doubt to the end as to whether the pregnancy was not extra-uterine.

Delivery *per vias naturales* seemed impossible, so we performed Cæsarean Section the following day. Under the anæsthetic the uterus could be raised up out of its pendulous position, so that I was able to incise the anterior or under surface and extracted a fœtus 7 lbs. in weight. The lower part of the uterus was then found to be hard as if the seat of a tumour growth, but this proved to be the head of another fœtus,

which was then delivered. The uterus, then contracted, was readily replaced into its normal position, and the operation completed in the usual way. There was no tumour or any other abnormality that we could find to account for the markedly abnormal pendulous or flexed condition of the uterus. There was an unusually small amount of liquor amnii, and it seemed difficult to believe that two fœtuses, each about 7 lbs. in weight, could have been accommodated in the uterus, which was not abnormally enlarged. The one fœtus was lying longitudinally head lowest; the second lay behind transversely with the head to the right. The patient made an uneventful recovery, and left the hospital in three weeks very proud of herself and her twin sons.

One would naturally seek for an explanation of the abnormal position of the uterus in the twin pregnancy, but I have failed to find any similar recorded case in the literature on this subject. That it was not due to any pelvic contraction causing an abnormal prominence and pendulous condition of the abdomen is certain. The patient was well developed and the pelvis rather larger than normal. Moreover, in cases of pendulous abdomen one does not get the extraordinary upward displacement of the cervix and elongation of the vagina that was present in this case. That these conditions were not dependent on the twin pregnancy and may occur occasionally apart from this would seem to be proved as follows. By one of those curious coincidences that one comes across now and again in the course of one's work, it happened that two days after the operation I have just referred to, the Resident gave me a letter he had received from a patient who had been delivered normally in the hospital some three or four months previously. This patient had undergone a Cæsarean operation in America in her first pregnancy, and came into hospital in Edinburgh for the same operation towards term in her second pregnancy. She had been seen by Dr Haig Ferguson, who could find no reason for this, and the patient delivered herself normally of a full-sized healthy child.

It seems that after leaving hospital she had written to the surgeon who had performed the Cæsarean Section in America, reproaching him for having done an unnecessary operation as she had had a second child without any difficulty. It was the doctor's letter written from America to the patient in answer to her complaint that the Resident handed to me, and which the patient had forwarded to him.

In it the doctor states that the "uterus in developing before

with pregnancy became upside down. Cervix was up next to ribs, vagina at least one foot long, top of uterus just above the pelvis. . . . On operating, incision was through the back of uterus. After this was closed the uterus was tipped back in place."

I cannot say that the cervix in my case "was up next the ribs" but it was making that way. Has any Fellow come across a similar case, or has he any explanation to offer of the very marked upward displacement of the cervix, and the anteverted or flexed and pendulous condition of the uterus, in these two cases?

EXHIBITION OF SPECIMENS.

Dr R. W. Johnstone showed—two cases of **ovarian cyst** removed during early pregnancy, one containing the corpus luteum of pregnancy.

Dr Gertrude Herzfeld showed—(1) case of **uterine fibroid** undergoing sarcomatous degeneration, removed during pregnancy: coincident spheroidal-celled carcinoma of the stomach.

(2) Case of **menorrhagia of puberty** where uterine scrapings showed a very proliferative glandular hyperplasia suggestive of early malignancy.

Dr H. S. Davidson showed—specimen of **cervical fibroid** with three months' pregnancy.

The President (*Dr Lamond Lackie*) showed—(1) uterus with tumour-like mass adherent to fundus. Appearances suggested chorion epithelioma. Pathological report—"**Degenerating Placental Tissue.**" (A Committee, consisting of Drs Johnstone, Davidson, Young, and Browne, was appointed to investigate and report on this specimen at next meeting.)

(2) Uterus showing **combined adeno-carcinoma and squamous epithelioma.**

PRIVATE BUSINESS.

The following were elected Fellows of the Society: W. F. Theodore Haultain, D. N. Kalyanvala, Arthur J. D. Rowan, David M. Greig, Horatio W. I. Steen, Joan K. Rose.

THE DIAGNOSIS AND TREATMENT OF ACUTE TUBAL PERITONITIS.*

By J. W. STRUTHERS, M.B., F.R.C.S.E.

In different schools the conventions which determine the respective spheres of the general surgeon and the gynæcologist vary very much. Here, in Edinburgh, where it is customary to combine the practice of obstetrics with that of operative gynæcology, and where special wards are set apart in our hospitals for the treatment of diseases peculiar to women, pelvic surgery in women is entirely in the hands of specialists, and the general surgeon gets no training and only accidental experience in gynæcology. This arrangement is the outcome of a natural process of development in a school in which the study of obstetrics has always occupied a prominent place, the intimate relationship of gynæcology to obstetrics obviously suggesting that the specialist in obstetrics is best qualified to understand and deal with disease of the reproductive organs in women. While the arrangement has manifest advantages, it is not altogether free from drawbacks. When it is remembered that a very large part of the general surgeon's work at the present day is in dealing with the problems of abdominal surgery, it seems curious, and, I think, unfortunate, that he should not be expected to train himself so as to acquire at least a moderate degree of familiarity with pelvic surgery in women. If it were possible always to distinguish with certainty between diseased conditions arising from the uterus and appendages and those arising from other organs, a complete dissociation between the practice of gynæcology and general surgery would be more satisfactory than it actually is in practice. Unfortunately, however, such a distinction cannot always be made, and the surgeon or gynæcologist is apt to be called on, unexpectedly, to deal with conditions with which he is not familiar and which he would be more competent to handle had his training been on a broader basis. Speaking as a surgeon, from my own experience, I venture to assert that the surgeon's training and outlook are not wide enough if he is practically ignorant of gynæcology, and, as the corollary of this, one may perhaps risk the suggestion that the gynæcologist

* Read 8th February 1922.

would benefit by some experience in general surgery. Many of us, I am sure, can recall occasions when we have felt the want of experience in one or other field, and while I do not propose to refer to individual instances where trouble or even disaster has resulted on such occasions, I venture to bring before you to-night for discussion a subject which is of interest and practical importance to us all, for we all have to deal with it, namely, the problems arising in the diagnosis and treatment of acute peritonitis due to the spread of infection from the Fallopian tubes. I do so with diffidence, as a surgeon, in the hope that I may obtain guidance for myself and my surgical colleagues in handling cases which we are often called on to treat whether we like it or not. The questions involved are so important that any discussion which will throw light on them cannot fail to be helpful to the surgeons and possibly to the gynæcologists.

As you are aware, it is widely, if not universally, taught that acute appendicitis is best treated by the prompt removal of the diseased appendix. Expectant treatment has rightly given place to treatment by immediate operation, with the result that in a certain proportion of serious cases life is saved, while in a large proportion of cases in which life is perhaps not seriously threatened, operation cuts short a troublesome illness and effectually prevents recurrence by removing a structure which is of so little value that its absence is a matter of complete indifference. There is, however, a drawback to this policy of immediate operation which is always a matter of concern, namely, the possibility of confusing appendicitis, especially in its early stages, with other infective lesions in which the necessity for and advantages of operation are by no means so clear as in that disease. That this confusion exists and is difficult to avoid is shown by the fact that cases of peritonitis due to tubal infection are frequently sent into the surgical wards as cases of appendicitis. So much is this the case that one almost gains the impression that the frequency of tubal infection as a cause of peritonitis is not fully appreciated. Even when attention is necessarily directed to the matter, as in doing emergency surgical work in hospital over a number of years, it must be admitted that the distinction of peritonitis due to appendicitis from that due to salpingitis is often no easy matter.

Roughly, cases of tubal peritonitis may be divided into two

groups—those due to leakage from established chronic infective lesions of the uterine appendages, and those due to the spread of a recent tubal infection to the peritoneum. In both groups the onset of pain in the lower abdomen with vomiting and fever signalise the peritoneal involvement. The pain is usually bilateral but is often more severe on one side than the other, and tenderness and muscular resistance corresponding to the pain are present. The symptoms of peritonitis are evident enough, but difficulty arises when the attempt is made to define precisely the focus from which the infection has arisen. If the symptoms are definitely limited to the right iliac region proper, and if there is no history of pelvic disease and no vaginal discharge, a tubal infection may be ruled out; but when the pain and tenderness are more central or bilateral, as they so often are, a special effort must be made to determine or exclude its presence. A history of previous pelvic trouble will naturally direct suspicion towards the tubes, but in any case a careful examination of the pelvis must be made. The best plan, if circumstances permit, is to take the patient to the operating room, give an anæsthetic and make the examination under the best conditions for accurate diagnosis. If diseased appendages can be felt as the probable source of the infection, the question then arises as to whether operation should be done at once or whether the acute stage of the illness may be allowed to run its course and operative interference undertaken later.

We may ask ourselves four questions: Is operation needed to save life, will it cut short the illness, will it prevent recurrence, has it any serious drawbacks? In general answer to these questions I would venture to reply from a comparatively limited experience, that operation is rarely needed to save life, for the infection is seldom of a virulent type and recovery from the peritonitis due to leakage from pyosalpinx is the rule. On the other hand, operation cuts short the illness, prevents recurrence, and has no serious drawbacks, for the tubes are already functionless and their removal does not prejudice the patient in any way. Given that the operation can be done under good conditions, with proper assistance, good light, etc., it seems to be in the patient's best interests to do it at once and deal with the conditions found in a radical way. The details of these conditions I do not propose to touch on for I am only concerned at present with the general aspect of the problems arising.

On the other hand, if, for any reason, conditions for operation are unfavourable, delay may be allowed with the knowledge that no serious risk is being run, provided that the diagnosis of leakage from a pyosalpinx can be confidently made and that the symptoms are not those of a virulent infection with grave constitutional disturbance. If serious doubt exists preparation for operation should be made at the earliest possible moment. More difficulty arises in dealing with pelvic peritonitis when the infection cannot be attributed to leakage from pus tubes, and the diagnosis lies between acute salpingitis and appendicitis. When the pain and tenderness are low down and bilateral, when there is a purulent vaginal discharge, and where the general impression conveyed is that of a widespread infection of a mild type, an acute salpingitis with associated peritonitis is very likely the cause of the symptoms. Under these circumstances I am bound to say I find it difficult to make a decision as to the right line of treatment. Not long ago I happened to have five cases under observation at one time. Four of these were operated on and did well, while the fifth was not operated on and had a long and serious illness. Quite recently a patient came under my care in Leith Hospital with a very acute tubal peritonitis. The infection was a streptococcal one, and removal of the tubes entirely failed to check the progress of the disease, which ended fatally two days after the operation.

The infection is a gonococcal one in the majority of instances and seems to be rarely attended with serious risk to life. Most writers advise that palliative measures should be used in the treatment of acute salpingitis with peritonitis, and state that operative interference is not indicated in the acute stage. While I am inclined to agree with this I should be glad to learn from those with more experience than I have, whether it is safe to rely on palliative measures or whether operation is ever indicated.

Perhaps most difficulty of all arises in cases where salpingitis is suspected as a cause of peritonitis but cannot be diagnosed with confidence. Vaginal discharge is often very slight and apt to escape notice. Pelvic examination gives no help for the tubes are not sufficiently enlarged to be recognised as diseased. An inflamed appendix lying in the pelvis, as it so often does in women, may give rise to clinical features exactly resembling those associated with salpingitis and there is beyond all doubt quite a large number of cases where a real distinction cannot be made. What is to be done? Wait and see or look

and see? Operation should be undertaken and the abdomen opened in the middle line, for in cases where the appendix is at fault and lying in the pelvis it can most easily be reached from the mid line, and at the same time the pelvic organs can be examined and dealt with if necessary. If the appendix, on the other hand, is healthy and the patient is found to have an acute salpingitis, how is the operation to be concluded? The tubes are red, swollen, a little distended with pus which oozes from the fimbriated end when they are handled, and there is a serous exudate in the pelvis with a deposit of lymph on the peritoneal surfaces adjoining the tubes. Experience teaches that the pus usually contains few organisms. While the infection is usually gonococcal, it may be pneumococcal or streptococcal, without any difference manifest to the naked eye. Are the tubes to be removed and the patient rendered sterile? Are they to be left oozing pus into the peritoneal cavity, and, if so, is the wound to be closed or is a drain to be inserted?

I doubt if anyone can give the answer which will completely remove the difficulty in deciding on the right line of treatment, namely, to state the actual results as regards the tubes in a large number of cases of proved salpingitis. Some may, however, be able to quote a sufficient number of cases in which pregnancy has followed the disease, to show that restoration of function may follow acute salpingitis in a sufficient number to make it one's duty to leave the tubes in every case, except in the presence of local and general signs of a really virulent infection.

In the last fifteen years I have operated on a number of cases during an attack of acute salpingitis. In some, where the infection seemed very acute and the tubes unlikely to remain patent, I have removed both tubes, leaving the ovaries when they appeared healthy. In some I have removed one tube and left the other, perhaps an irrational thing to do for both are always involved. Sometimes, however, one tube appears to be decidedly less affected than the other, and in a few cases I have left the less damaged tube, being unwilling to sterilise the patient. So far I have not had occasion to regret this apparently half-hearted proceeding. The patients have recovered well from the operation, illustrating the fact that leakage from a tube may result in very little disturbance. The late results are unfortunately unknown to me except in

two cases. In one the patient subsequently became pregnant and in the other the remaining tube had to be removed later on account of persistent infection.

In a few cases I have left both tubes, where the infection seemed a very mild one. The attempt to reach definite conclusions or formulate rules for guidance, on the evidence which I have had the opportunity of collecting, has not been very successful. Admitting that most cases of tubal peritonitis will recover without operative interference, it is a difficult thing to do, and goes very much against the grain to leave tubes alone from which pus is actually leaking.

Their removal certainly tends to cut short the patient's illness and is beneficial as far as the immediate result is concerned. Unfortunately it renders the patient sterile. If it can be shown that in a definite number of cases resolution with restoration of the function of the tubes may follow an attack of salpingitis, the indication to leave the tubes alone is clear.

Late results in these cases are exceedingly difficult to ascertain, for the type of patient in whom this disease is most common usually disappears after being discharged from hospital and cannot be traced. Personally I can give no information of real value as to late results, and as a surgeon I would appeal to my gynæcological colleagues for information and instruction on this point.

In conclusion I would suggest the following points for discussion. In peritonitis due to leakage from chronic infections of the appendages is immediate operation indicated? In cases of peritonitis due to acute salpingitis is immediate operation ever called for, and if so when? When the abdomen is opened for suspected appendicitis and an acute salpingitis is found to be present, should the tubes be left or removed? Lastly, and perhaps most important of all, should steps not be taken to provide some training in gynæcology for the general surgeon and in general abdominal surgery for the gynæcologist? If this could be achieved, I am sure both would do their work better and no harm could possibly result.

Discussion.

Dr Ballantyne thought they were much indebted to Mr Struthers for raising a discussion on one of those borderland subjects between gynæcology and surgery. He would commence with a small matter of terminological criticism. There was a disease, though it was not

very clearly determined, called perisalpingitis, which might also be called tubal peritonitis; and a better idea of Mr Struthers' subject would be gained by calling it "peritonitis of tubal origin." Not only was it difficult to distinguish between tubal disease and appendicitis, but a small dermoid with twisted pedicle on the right side might also be confused with the appendix. He thought one could not be quite sure which it was without opening the abdomen. Dr Ballantyne referred to the checking of gonorrhœa in pregnant women, a phase with which he was more particularly engaged. In this way some of the cases of which Mr Struthers had spoken would be prevented.

Dr Haig Ferguson thought that such interchange of experiences and opinions between surgeons and gynæcologists could not but be helpful to both departments and he hoped it would be continued. He quite realised many of the difficulties Mr Struthers had spoken of. As regards the differentiation between tubal inflammation and appendicitis, he had generally found that tubal conditions gave sufficient pelvic indications for a fairly accurate diagnosis. Sometimes both tube and appendix were involved; but in cases of doubt, it generally turned out to be the appendix that was at fault. In acute salpingitis Dr Ferguson thought it was better to wait before operating, unless there was acute general peritonitis. He was not in favour of leaving a leaking tube, gonorrhœal or otherwise. He had never found the general surgeon deficient in the essential knowledge of gynæcology, but he thought they might with advantage have a better knowledge of obstetrical diagnosis, which would often serve them in good stead.

Mr Wilkie said he was constantly being called upon to deal with such cases and had never been quite able to make up his mind as to what was the right thing to do. In regard to diagnosis, he had nearly always found that in cases where the peritonitis was due to tubal inflammation the patient was much more restless than in appendicitis and showed much more abdominal hyperæsthesia. In only one case had he removed both tubes, and in the last few cases he had left both. In cases of salpingitis, it was interesting to note that when the abdomen was closed the temperature fell within twenty-four to forty-eight hours, and the patient made a rapid recovery, and it seemed as if opening the abdomen had something to do with it. The information which surgeons desired at the moment for their guidance was whether such cases were to be left alone or operated upon immediately.

Dr H. S. Davidson thought that these cases were not so difficult of diagnosis by the expert. The reason that a number of so-called borderland cases found their way to the surgical side of the Infirmary was that they were first seen in the out-patient department by a resident surgeon. He diagnosed appendicitis, and the woman was in the ward

before the surgeon saw her and found out the mistake, and he hardly liked to refuse to do something. Dr Davidson considered that if the infection was due to the gonococcus, a case could be safely left for six months, but in streptococcal infection delay in operating was frequently fatal.

Dr Johnstone said that if there was reason to judge from the history that the infection was probably streptococcal, immediate operation was indicated, and such operation had usually to be radical in its nature. On the other hand, when the history pointed to gonorrhœa as being the more probable cause of infection, operation should be delayed for several months, because in such cases it was often possible at the postponed operation to restore the patient to health and relieve her pain by a much more conservative procedure than might be deemed advisable if operation were undertaken during the acute stage. On the gynæcological side of the Hospital they saw very few of these cases because they were all stopped in the surgical out-patient department, diagnosed more or less inaccurately by a house surgeon and sent to a surgical ward. He suggested to Mr Struthers that if all doubtful cases of this sort were sent over to the gynæcological side of the house they would, after a lapse of, say, two years, be in a much better position to discuss the matter with him. It was impossible to speak off-hand about the prospect of an infected tube recovering subsequently to such an extent as to permit of pregnancy occurring. He was sure that references to American literature in particular, where the "follow-up system" is much more in vogue than in this country, would reveal statistics on this particular point.

Dr Young did not agree that there was no difficulty in distinguishing between appendicitis and salpingitis—theoretically it might be easy, but not in practice. As regards the treatment of the latter, in text-books there were very divergent opinions as to whether to operate or not. The difficulty arose from the fact that, whilst in some cases the infection might be due to a virulent streptococcus, in other cases (*e.g.* gonorrhœa) the danger to life was small. There was no reliable means in many cases of discriminating between the mild and the severe cases by the character of the symptoms, and operation was necessary in all cases of doubt. He believed that where operation was called for in an acute ascending infection after labour or abortion, removal of the tubes was necessary. Where the history pointed to gonorrhœa the treatment should be expectant.

The President said it was his impression that the tubes do recover, and he had seen many cases in which the patient became perfectly well, although whether the function of the tubes was completely restored he

was not prepared to say. Certainly there should be no operation on them unless the patient was in a critical condition. He agreed with Dr Haig Ferguson that surgeons should have a fuller training in obstetrics. He had great pleasure in offering to Mr Struthers the thanks of the Society.

Mr Struthers in reply criticised the conventional opinion which some of the Fellows had expressed, that cases of gonorrhœal salpingitis should be left alone and streptococcal cases dealt with at once. This was the academic view, but was not very helpful when one had to make up one's mind in a hurry owing to the difficulty in knowing which was the infecting agent.

A CASE OF OVARIAN DERMOID RUPTURING INTO THE BOWEL DURING LABOUR.*

By HUGH S. DAVIDSON, M.B., F.R.C.S.E.

THOUGH dermoid tumours are not uncommon as complications of pregnancy and labour, the result in this particular case was so unusual and serious that I considered it worth recording before this Society.

Mrs R., 41, who had had seven previous children, sent for the nurses from the Deaconess Hospital on 29th November as the membranes had ruptured. Beyond finding the presenting head high up and the os difficult to reach, nothing was noted. Pains came on at 11 P.M. on 30th November but were weak, and labour was described as slow till 4 A.M. on 1st December, when the nurse detected a swelling posteriorly and sent for the resident. He found the os very high up, the head presenting above the brim and difficult to feel, and a swelling posteriorly below presenting part. Not being sure of his diagnosis he sent for an ambulance to transfer the patient to the Maternity Hospital. Admitted there 8.15 A.M., the resident detected nothing abnormal and allowed labour to go on till 12, when he applied forceps and proceeded to deliver the child. When the head was at the perineum a sausage-shaped tumour bulged through the anus. On pushing it aside it burst and extruded sebaceous matter and hair, typical of a dermoid growth. The child was easily delivered but slightly asphyxiated and required artificial respiration. In doubt as to what to do he pulled down the tumour and ligatured it as high up as he could and cut the remainder off below the ligature.

Realising what had occurred, he rang me up later in the afternoon and I saw the patient at 5 P.M. On rectal examination I could feel the ligature extending up to a tear in the bowel and leading into the peritoneal cavity. After discussion with Dr Oliphant Nicholson I determined to operate, and at 5.30 P.M., under ether anæsthesia, I opened the abdomen. The first difficulty was the excessive stoutness of the patient and the inability to get an extreme Trendelenburg position. I found on the right side a collapsed cyst constituting the entire ovary but completely emptied of all contents, with, at one extremity, a ligature. I removed the cyst and roughly covered the raw surface with peritoneum. I then endeavoured to see where the tear in the bowel was, but owing to the large uterus and a rather prominent

* Read 8th February 1922.

sacral promontory I could not detect any signs of it. To obtain better access I performed supra-vaginal hysterectomy, removing most of the cervix. On traction upwards of the pelvic colon I could just see the beginning of the tear in the bowel. It was longitudinal in character and for the first inch was confined to the peritoneal coat.

Being unable to see more of the tear I began a continuous suture from above downwards, hoping that each successive stitch would bring more of the tear into view. This method proved successful, and after a few stitches had been inserted the tear was seen to extend through the muscular coat. I continued the stitch, picking up the muscle layer, and eventually discovered a perforation the size of a two-shilling piece through the mucous membrane as well. This was only demonstrated with the help of Dr Milne, who passed his finger from below, and it was situated at the lowest point in the pouch of Douglas. The tear was then seen to continue through the peritoneum forwards across the pouch of Douglas and slightly ascending on the posterior vaginal wall. Owing to the difficulty of access I continued my suture, uniting all the layers of the bowel and then the peritoneum to the anterior extremity of the tear and reversed the suture as a peritoneal covering. I then made an incision through the pouch of Douglas into the posterior fornix and sutured in a drainage tube. I then covered the raw area of the cervix, etc., with peritoneum in the usual way.

The patient's pulse before operation was 110, temperature 99.2° F., respiration 33. After operation, pulse 130, temperature 98.2° F. On admission she was coughing badly and her lungs showed typical bronchitis. Forty-eight hours later the tube came away, and on the 5th day half an ounce of castor oil was given. The bowels moved freely and at night the resident informed me that the patient had developed a fæcal fistula. When I saw her it was quite apparent that this was not the case but merely a stitch abscess in the fat of the abdominal wall, probably due to infection from the vaginal tube when it was inserted. The bronchitis continued to be distressing, and though the temperature continued between normal and 99° F., the pulse remained round 120. As the vaginal discharge was rather offensive I recommended a very gentle vaginal douche on the 11th day. This was followed by collapse, which was treated with strychnine and digitalis and the patient felt better. On the 13th day the temperature and pulse began to rise and an acute tonsillitis supervened, which lasted till the 18th day, when temperature and pulse fell together from, respectively, 102.6° F. and 130 to normal and 98. After a few days the temperature was swaying and the pulse 110, but the patient felt so well that I allowed her to get up for a little. Five days after getting up the temperature and pulse again began to rise markedly, and 35 days after operation she developed a rigor and the temperature

reached 104.4° F., pulse 156. She had some bronchitis but no definite patches of consolidation and the urine contained pus. Under appropriate treatment this cleared up, to be followed 44 days after operation by an undoubted attack of broncho-pneumonia. Luckily this was short in duration and two months after operation she was transferred to a Convalescent Home. At no time during her convalescence was the discharge from the vagina the least suggestive of fæcal matter. I examined her at the end of five weeks and the pelvis felt perfectly clear, apart from some slight thickening at the stump of the cervix.

Comment.—At the time of the operation it seemed to me that, having once opened the abdomen to get at the tear I must carry on till it was repaired, but on considering the case later I am not so sure that my line of treatment was the best in the interests of the patient. If the resident had not pulled on the discharging tumour, ligatured it, and allowed it to retract into the peritoneal cavity, could we have safely allowed it to remain as it was till it became adherent to the bowel wall, when it would possibly have gradually necrosed within the bowel, the adhesions shutting off all communication between the rectum and peritoneal cavity? This conservative line of treatment, I must admit, does not in the least appeal to me, unless the case had occurred in the depths of the country with unsuitable surroundings.

Second, would it have been better to have done a colostomy on the left side, bringing into the wound the lowest available portion of bowel and contenting oneself with free drainage through the posterior fornix, trusting to thus allowing any fæcal matter below the colostomy wound to escape by the drainage tube, and if necessary, to operate some months later when the uterus had completely involuted, so that one could obtain easier access to the original tear. This course would have enabled the patient to retain her generative organs intact, and on the analogy of perforation in rectal cancer would not have entailed much greater risk to her life. On the other hand, one's primary surgical instinct was to close the communication between the peritoneal cavity and the bowel at any cost, and in view of the successful termination I feel it was the safest line of treatment.

The tumour was, I should think, about the size of a tangerine orange before rupture. It is interesting that she had previously had seven children without any difficulty, so that both the

nurses and the doctor who first saw her were expecting little trouble with the confinement. What is difficult to understand is that the resident detected nothing abnormal when she came into the Maternity. Had the uterine contractions already forced the tumour into the bowel in a sausage-shaped formation so that it was not readily perceptible, or was this caused by the application of the forceps and the extra *vis e fronte* exercised by them.

All through the patient's "will to live" was a most potent factor in her eventual recovery.

Discussion.

Dr Haig Ferguson said there was no doubt that Dr Davidson did the right thing in an extremely difficult case. He sacrificed the uterus, but it was the best possible line of treatment, especially in view of the fact that the woman was 41 years of age and had several children. Dr Davidson was certainly to be congratulated upon the successful termination of the case.

Dr Johnstone said that the case was, so far as he knew, unique and he thought that Dr Davidson had adopted the best procedure. It reminded him of a case which he had when on duty at the Maternity Hospital some eighteen months ago. Dr Oliphant Nicholson asked him to see a patient whom he had sent into the Hospital after seeing her in consultation with Dr Ainslie. She was a woman who had had a series of easy labours before. The cervix was fully dilated, but with each pain a swelling bulged down through the anus. On examination this swelling was like a large sausage and dark purple in colour. At first he thought it was an intussusception, but on more careful examination there was no apex observable. On passing the fingers into the rectum the swelling, which was tense and felt as if it were full of fluid, extended up beyond the reach of the fingers and nothing in the nature of a pedicle could be felt. The possibility of its being a tumour, dermoid or other, invaginating the rectal wall, occurred to him, but nothing in the examination could be found to support this. The first thing being to get the child delivered, he gently pushed back the head with one hand, and it was then possible to slip the tumour up above the pelvic brim. Forceps were then applied and delivery completed without any difficulty, and the curious thing was that immediately after labour abdominal palpation and rectal and vaginal examination entirely failed to discover the tumour. It had disappeared entirely, and was never again felt. The patient made an uninterrupted recovery and the bowels acted normally. He

arranged for a sigmoidoscopy at the end of the second week of the puerperium, but before it could be performed the patient insisted upon going home.

Dr Young congratulated Dr Davidson on the surgical skill which he had displayed in dealing with the case. He thought that Dr Haultain had recorded a similar case, but in that case the tumour had been extruded through the vagina.

The President recalled a specimen shown by Dr Berry Hart in which the cervix had been torn off and expelled in the process of labour. He thanked Dr Davidson on behalf of the Society.

EXHIBITION OF SPECIMENS

Dr F. J. Browne showed a specimen of a **fœtal ovary** containing several mature Graafian follicles. The ovary was obtained from a full-time fœtus, and externally showed nothing abnormal except that several small translucent cyst-like structures projected on the surface. On laying the ovary open there were visible several small cysts about 1 or 2 mm. in diameter. Microscopically these were found to be mature follicles, each containing an ovum with membrana granulosa, discus proligerans, and liquor folliculi. There were also present hyaline bodies resembling corpora albicantia, with a very cellular structure somewhat resembling luteal tissue, surrounding them.

Dr Ballantyne suggested that the rupture of Graafian follicles found in a fœtal ovary might be causally related to the appearance of menstruation in the newly born, which occurred occasionally. He thought the explanation of Dr Browne's specimen was that the graafian follicle was about to burst, but of course it might be that it was undergoing semi-maturation, a process by which a number of Graafian follicles disappeared before the child reached puberty. Milk was sometimes found in the breasts of new-born babes, but as it occurred also in the male infant it was probably caused by some chemical from the mother getting through the placenta and influencing the child, and was not due to rupture of Graafian follicles.

Dr Davidson showed a specimen of **fibroma of the ovary**. It was the size of a walnut and occupied the medulla only, the

cortex being stretched over it all round. The patient complained of severe pain practically constant, with increased intensity for two days before the period. There was also menorrhagia probably explicable by the general fibrosis of the uterus, which was also present. There was no ascites.

Dr James Young exhibited specimens from a case of large **round-celled sarcoma of the uterus** associated with a mass in the right broad ligament to which a loop of small bowel was adherent. Both tubes were infiltrated with sarcoma, as was also an ovarian cyst on the left side. The bowel was infiltrated deeply with tumour tissue and its rupture gave rise to acute peritoneal symptoms ending in death.

PRIVATE BUSINESS.

Meeting—8th February 1922.

Death of Dr William Craig.—The President (*Dr Lamond Lackie*):—It is fitting that before commencing the business of the evening I should make a brief reference to the death of Dr William Craig, who was our Senior Fellow but one and who was the oldest practitioner in the city. Dr William Craig, who passed away on Friday last, joined the Edinburgh Obstetrical Society in 1870, and throughout his long life never ceased to take an active interest in its doings. For thirty-five years he was the honorary and honoured Treasurer of the Society, and many of us know that it was entirely due to his enthusiasm and business ability that the Society was raised from the verge of bankruptcy to the flourishing condition in which he left it when he presented his last financial statement in 1910. All who knew him held Dr Craig in the very highest esteem, and this Society will ever hold his name in affectionate and most grateful memory. He has passed to his rest full of years and of honour, and our sympathy goes out to his sorrowing relations. The funeral took place on Monday and this Society was officially represented by the presence of Dr Fordyce, a Vice-President, and of Dr Davidson, the Senior Secretary. I am sure it will be your wish that we record in our minutes our deep sense of loss by the death of Dr Craig, and that an excerpt be sent to his son, Dr John Craig, who is a member of our Council.

Dr Ballantyne seconded this motion and mentioned the fact that on several occasions Dr Craig had been offered the Presidentship of the Society. His innate modesty had prevented his taking it, and he had preferred to remain as Treasurer.

Private Business

This was recorded, and it was agreed to send an excerpt Minute to Dr John Craig, his son.

The following were elected Fellows of the Society:—Robert H. H. Newton, B.A. (Cantab.), M.D.; George Morris, M.B., Ch.B.; Frank Holmes, M.B., Ch.B., Lieut. R.A.M.C.

CÆSAREAN SECTION AND ALTERNATIVE TREATMENT.*

By J. LAMOND LACKIE, M.D., F.R.C.P.E., President of the Edinburgh Obstetrical Society, Physician to the Royal Maternity and Simpson Memorial Hospital.

WHEN I first thought of this communication I had meant to consider somewhat fully the present position of Cæsarean section from several points of view, but on the appearance of the latest number of the *Journal of Obstetrics and Gynæcology of the British Empire* I realised that to do so was quite unnecessary and almost an impertinence, for in the periodical referred to there is a complete survey of present opinion and experience with regard to Cæsarean section. Further, Dr Ballantyne's critical review of the subject which has recently appeared in the *Edinburgh Medical Journal* must have been read with great interest by many. It is a wonderful piece of work, complete and exhaustive, and the bibliography he gives will be of lasting benefit to other observers.

I do not think there can be applied to Edinburgh the argument that "the very ease and safety of Cæsarean section under modern conditions is leading to its abuse." Here we have been most conservative and almost lagging in extending the limit of indications. We cannot agree with Professor Newall of Harvard, who writes:—"The increased success which has attended the performance of Cæsarean section as an operation of election instead of as an operation of last resort has led to its employment in many cases to the exclusion of methods of delivery better suited to the needs of the given patient, until at the present time it is the most abused obstetric operation. . . ."

It seems to me that just the very reason why Cæsarean section is now attended by such outstanding success is that it is no longer regarded as a last resort but as an operation of election performed before difficulty and danger arise. One quite realises that within recent years the operation has "boomed" in popularity, and there may now be a tendency to widen the relative indications somewhat unduly; but on the other hand we all know that thousands of lives have been

* Read 8th March 1922.

saved by the operation when other means would certainly have failed. No doubt the operation is easy, quick, comparatively safe, and dramatic, and just for these reasons it is tempting; but one quite agrees that it should never be undertaken if other obstetric methods, perhaps more difficult and more tedious, would achieve the same result with less risk to mother and child. Dr Blacker has shown that with regard to several possible indications, Cæsarean section does not show an improved mortality as compared with older and more tried methods of treatment. He very wisely reminds us that "an operation should not be resorted to as an easy way out of a difficulty without due regard to the risk inseparable therefrom to the life of the mother, and in the mistaken belief that the life of the child should be considered of equal value to that of the mother."

No one can deny that the operation has been performed too often and too readily for trifling and unwarrantable reasons, such as for inertia uteri, hydramnios, epilepsy, twins, varicose veins, delayed first stage and albuminuria, but on the other hand the results obtained have more than justified the extension of the indications to many conditions which were never thought of as suitable twenty years ago. Many of us remember the old table which appeared in many text-books and in many lecture rooms, and which gave the operation appropriate to different degrees of pelvic contraction. At the bottom of the list there appeared—"Below 2 inches—Cæsarean section." Now this limit has been gradually raised, until at the present time one may take a conjugata vera of $3\frac{1}{4}$ inches as a justifiable indication for the operation. To some this may seem unduly large, but at all events such a pelvis demands the most careful measurement of the relationship between the size of the child and the size of the pelvis. This can be determined with ease, in many cases, but in many it is not nearly so easy as is described, and especially so in fat women. Personally, in a patient with a conjugata of $3\frac{1}{4}$ inches one never hesitates to recommend Cæsarean section. Each case is, of course, considered on its merits and the age of the patient, surroundings and previous history are carefully studied before coming to a decision. If there is a history of a previous craniotomy or of an unsuccessful induction of premature labour, or if the patient is an old primipara there is no difficulty in making up one's mind that Cæsarean section is the best operative

procedure. The employment of high forceps in such cases gives unfavourable results both to the mother and child, and as time goes on it is quite certain that in fewer cases will forceps be applied. How often in the gynæcological departments can one trace a patient's condition of prolapse and pelvic misery to a very difficult labour terminated by forceps which also destroyed the child. Although the actual mortality from high forceps delivery is comparatively low in selected cases (1·4 per cent.—Munro Kerr), the maternal morbidity in this author's series is rated at 20 per cent. The fœtal mortality is 23 per cent.

Cæsarean section does not seriously compete with induction of premature labour. I believe that, so far as pelvic contraction forms an indication for it, the latter operation should be confined to cases in which the conjugata vera is between $3\frac{1}{4}$ inches and $3\frac{3}{4}$ inches. Induction when the conjugate is only $3\frac{1}{4}$ inches still shows a fœtal mortality of at the best 36 per cent., and as the conjugate becomes smaller so naturally the mortality rises, until taken all round the fœtal mortality from induction of premature labour is nearer 48 per cent. In hospital practice it is extremely difficult to get data from which to judge the duration of pregnancy, and therefore often impossible to gauge the right time for interference. If too early, a dead child, or one that will not survive, is born; if too late the result is the same. I have on two occasions induced labour, but as the head remained fixed at the brim I did Cæsarean section, and both mother and children did well. In my opinion induction of premature labour is an unsatisfactory operation, unless brought about after the thirty-sixth week, and provided that the conjugata vera is more than $3\frac{1}{4}$ inches. And then it is just in those cases where there is only slight contraction that good results are obtained from doing nothing. The patient goes to full time and a spontaneous labour takes place, or at most easy forceps are applied.

It is agreed that it is often extremely difficult to determine the best line of treatment in these borderline cases, and therein, as Munro Kerr says, lies the great fascination of obstetric practice. I fear that my tendency when in doubt is to recommend the Cæsarean operation. Not long ago I was asked to see, seven miles from Edinburgh, a patient, a primipara, who had been in labour for two days. The os was nearly fully dilated, but the head was above the brim. The medical

attendant assured me that no progress had been made for twenty-four hours, and on examination it was recognised that the conjugata vera was not more than 3¼ inches. The doctor very wisely had not applied forceps, and I agreed that to attempt delivery per vaginam would end in disaster to the child at least. The patient was removed to a nursing home in Edinburgh, and Cæsarean section performed with the best results. This patient, two years later, had labour induced successfully at the thirty-sixth week. This is only one example of many, and I would urge that in private practice more cases should be dealt with in this way than obtains at present. In hospital practice it is different, for one of the main reasons for the establishment of antenatal departments is the recognition of pelvic abnormality during pregnancy. There is one objection to induction of premature labour which may be regarded as a minor one by some but is very real. The mere suggestion that all is not well, and that "something may have to be done," along with the comparative frequency of examinations to see if the head can be pushed through the brim, tend to produce an agitated state of mind in some patients, which is not the best for the pregnancy and labour.

There is, however, one operation of induction which I am sure is not carried out as frequently as it might be. It is not the induction of premature labour but simply the induction of labour at full time. The difference in size and development between a child at full term and one that has gone a week or two beyond it is enormous, and I am sure we all regret many cases where even after careful examination we did not interfere, and so prevent a very difficult labour and possibly the death of a child. There are some interesting figures in the last report of St Mary's Hospital, Manchester, published the other day. Out of 2924 patients in the year 1920, there were 123 cases of contracted pelvis. Of these only 9 were delivered by forceps, only 8 by induction of labour, and 101 by Cæsarean section. Indeed there were as many Cæsareans as there were forceps cases for all indications, viz., 101. In our Maternity Hospital here the percentage number of Cæsarean sections is increasing, and craniotomy is fortunately becoming rarer. For example, during the July to September quarter last year we had twelve Cæsareans, and during the same time in 1920 we had eight. Twenty years ago a Cæsarean section was an event, and all who could flocked to see it. Now the opera-

tion causes no excitement and is ignored except by those immediately concerned.

Tumours of uterus and ovaries, as is obvious, have long been recognised as a clear indication for the operation of Cæsarean section, and in this connection I merely wish to record shortly notes of three cases complicated by the presence of fibroid tumours.

Case I.—Mrs B., aged 35, who had had two normal pregnancies and labours, when pregnant for the third time had a threatened abortion at the third month, and on examination it was found that she had developed a group of fibroids of the uterus. I advised a hysterectomy then, but the patient and her husband were very averse to this and preferred the alternative of allowing the pregnancy to go on and delivery by Cæsarean section. Later examination proved that this operation would be necessary as one of the fibroids became very large, was situated low down, and effectively blocked the entrance to the pelvic canal. The eighth and a half month was reached and then labour pains started. The patient was removed to a home and Cæsarean section performed, a healthy male child of 7 lb. being delivered. The main fibroid proved to be a large cervical one, but the patient's condition was such that I resolved to sew up the uterus and the abdominal wall as rapidly as possible, as I felt that she could not survive a hysterectomy at the moment. Five days later the patient insisted that a twin must be being born, as she had such bearing down pains: she was very ill and evidently suffering from acute sepsis. On examination one found in the vagina a large sloughing fibroid with a broad base growing down from the cavity of the uterus. As I knew that there were several other fibroids, and that the whole uterus must be acutely infected, I determined to open the abdomen once more and remove the uterus. This I did with very little hope of success, but, strange to say, the patient made a good recovery, although the abdominal wound became very septic, and she left the home six weeks later wonderfully well. Three months later she had an attack of cystitis which proved intractable, and which was followed by a pyonephrosis on the right side, and perinephritic abscess. This latter was opened and later the kidney was removed. Once more the patient seemed to get well, and fifteen months after her Cæsarean section was in very fair health. Suddenly, however, an attack of double pneumonia supervened and to this she succumbed.

It was surprising that Mrs B. got over the primary operations of Cæsarean section and hysterectomy considering the acute septic condition. Slowly, however, the infection spread to the bladder and the kidney, and though she survived the nephrectomy

she died from a pneumonia three months later. It is obvious that in all cases of Cæsarean section, complicated by uterine fibroids, either myomectomy or hysterectomy should be performed at the same time. If the tumour is submucous or interstitial the risk of its becoming septic is great.

Case II.—Mrs G. S., aged 39, married in January 1920, had an early abortion in April of the same year. In August she was found to be again three months pregnant, and at the same time a fibroid the size of a hen's egg was found on the left of the uterus. The pregnancy went on normally but the fibroid increased in size. It did not, however, seem to interfere with the entrance to the pelvic brim, and yet even near full time the head remained high up "bobbing" above the brim. On 8th March 1921 the patient went into labour, and the os dilated in the course of eight hours but the head did not descend. Forceps were applied and a tentative attempt at extraction made, but the fibroid then seemed to come into the brim and prevent descent of the head, and the attempt to deliver per vaginam was abandoned. The patient was removed to a nursing home and Cæsarean section performed, when a healthy male child of 7 lb. was extracted. The fibroid, which was situated low down, was left, although under other circumstances I would have removed it. It was subperitoneal with a broad base, and had become the size of a goose's egg. Mrs G. S. made an uninterrupted recovery except for a stitch abscess. When last seen a week ago she was very well, and the fibroid had become reduced to its former size.

All the conditions necessary for a successful Cæsarean were not present in this case. However, as one felt sure that the forceps were applied under strict aseptic precautions, I did not hesitate to perform the major operation.

Case III.—Mrs M. S., aged 35, primipara, was admitted to the Royal Maternity Hospital, Edinburgh, on 4th July 1921, from the antenatal department. She had a fibroid the size of a fœtal head at the fundus of the uterus: the presentation was a breech and the diagonal conjugate was only 4 inches. These three indications combined determined me to do a Cæsarean section, and if possible to enucleate the fibroid. The operation was performed on 27th July and a 9 lb. living child extracted. However, on examining the fibroid it was found to extend right through to the decidua of the uterus, and as there were other smaller fibroids throughout the wall of the uterus I did not attempt a myomectomy but removed the uterus by subtotal hysterectomy. The patient did very well except for a moderate attack of phlegmasia alba dolens, and left the hospital quite well on 7th September.

In this case no one of the conditions present was an absolute indication for Cæsarean section, but the patient being a primipara, the presentation being a breech, the pelvis being slightly contracted, and the presence of a fibroid all combined to justify the operation.

The results of Cæsarean section in *Eclampsia* are not very satisfactory, for the latest statistics give a maternal mortality of 31 per cent. and a fœtal and infantile mortality of 50 per cent. I have not yet met with a suitable case. The ideal for the operation would be an elderly primipara with an undilated and undilatable os, whose condition of eclampsia did not rapidly improve under medical treatment.

As regards *Placenta Prævia*, it is now admitted that Cæsarean section holds a definite place in the treatment of such cases. First recommended by Lawson Tait as far back as 1898, it has gradually come to be recognised as good treatment in certain cases. It is very commonly admitted that, for example, especially in primiparæ with central or marginal placenta prævia, section offers the best chance for both mother and child, but in the lateral variety ordinary methods of rupture of the membranes and version or forceps should give good results. By the ordinary recognised methods the latest statistics show a maternal mortality of 4 to 10 per cent. and a fœtal mortality of about 40 per cent., whereas by the Cæsarean method the figures are 10 per cent. and 15 per cent. respectively. On these figures there is good reason for supposing that in future more and more cases should be and will be treated by Cæsarean section. Some time ago I saw in consultation a primipara with a central placenta prævia, severe hæmorrhage, and a small os. I recommended Cæsarean section but this was not done. The child was born dead, and the mother was extremely ill for weeks from septicæmia.

In the most serious cases of *Accidental Hæmorrhage*, the concealed variety, Cæsarean section seems to be the best treatment in some cases. In such there is no question of saving the child; but when in spite of treatment by ordinary methods the patient becomes progressively worse, Cæsarean section or hysterectomy seems to be the last resort. I would simply note in passing that Cæsarean hysterectomy has a mortality of 46 per cent. compared with about 11 per cent. from simple Cæsarean for accidental hæmorrhage. The fœtal mortality is, of course, high, some 80 per cent.

Prolapse of the Cord has been regarded by some operators as sufficient justification for the major operation, but one cannot agree with this. On one occasion I did a Cæsarean section on a patient who at the seventh month of a previous pregnancy had been delivered by craniotomy. She was sent into hospital at full time with the cord prolapsed into the vagina, and on examination one found the conjugata vera only $2\frac{1}{2}$ inches. The cord was pulsating normally and, therefore, after thorough disinfection of the vagina Cæsarean section was done and both mother and child did well. In this case the indication for the operation was not really the prolapse of the cord but the contracted brim. Similarly impacted shoulder presentation must be a very rare indication, but I remember very well assisting Dr Fordyce with one such case in which it was impossible to deliver per vaginam by any means, and Cæsarean section was necessary even though we knew the child was dead. There are only 4 cases recorded in Eardley Holland's list with a mortality of 50 per cent. for both mother and child.

Of recent years there have been recorded a number of cases of contraction of Bandl's ring or of the contraction ring which prevented delivery, and it is possible that in future it will be found that the best treatment for some of these is by Cæsarean section. It cannot be often that a rigid cervix or a rigid vagina should necessitate Cæsarean section, but such cases do occur. Many of us can recall cases where laceration was so great that we wished we had delivered by the abdominal route. Some years ago I assisted the late Dr Haultain with a Cæsarean section which was performed because the laceration of the vagina at the first confinement had been so great and the tears had been so thoroughly sewn up that delivery per vaginam would have been fraught with great danger on account of the cicatrisation of the soft parts.

In a few cases Cæsarean section has been performed on account of the head of the child being unduly large, or for malposition or malpresentation. It must always be difficult to make up one's mind about these cases, for we all know the head which "bobs" at the brim and at all events *seems* large and yet with proper pains and time for moulding is delivered spontaneously. One cannot agree that hydrocephalus or hydramnios or varicose veins should ever justify Cæsarean section, but such cases are recorded. Similarly, neither ventrofixation of the uterus nor the interposition operation for

cystocele should ever be indications as these operations should not be done till after the menopause.

Serious disease endangering the mother's life sometimes under special circumstances justifies the operation, for example heart disease, which gives a maternal and fœtal mortality of 20 per cent., advanced tuberculosis (2 cases with no deaths), intestinal obstruction (4 cases with two maternal deaths), and single cases of diabetic coma, septicæmia, and chorea all fatal (Holland's figures). Breech presentation in primiparæ, delayed first stage of labour, and albuminuria have been the indication for the operation but are quite unjustifiable as such.

I have referred to most of the indications for Cæsarean section, and we agree that the limitations of the operation should be extended to include a few; but I am sure that in Edinburgh we will rightly be either slow to adopt some of them or will reject them altogether.

The statistics compiled by Professor Munro Kerr and Dr Eardley Holland are most interesting. In 1882 the maternal mortality from Cæsarean section was 50 per cent., and at that time the operation was undertaken only for absolute pelvic contraction or for obstructing, tumours, or for cancer.

Munro Kerr and Holland's figures as a contrast to the above are remarkable:—

Condition.	Total Cases.	Maternal Deaths.	Percentage.
A. Not in labour . . .	1202	19	1·6
B. Early in labour . .	389	7	1·8
C. Late in labour . . .	220	22	10
D. After induction of labour .	35	5	14
E. After attempts at delivery by forceps or craniotomy	107	29	27

In classes A and B the mortality has fallen to a half of what it was when Routh collected his cases in 1911.

I have never been convinced of any advantage in waiting till the patient was in labour, and the above table would seem to confirm this. In nearly all cases I try to choose a day near, but not quite at, full time. The advantage of a dilated cervix is more than counterbalanced by proper preparation of the patient and the choice of hour for the operation.

Of recent years there has been a tendency to substitute

another for the classical operation of Cæsarean section, mainly on the ground of the risk of rupture of the scar in a subsequent pregnancy or labour. The lower uterine segment incision is becoming more and more popular and has much to commend it. Eardley Holland has shown that in 4 per cent. of cases of classical Cæsarean section rupture of the scar occurs in a subsequent pregnancy or labour, and in a great many more the scar is unsatisfactory. Munro Kerr gives various reasons for this, such as the difficulty of obtaining absolute asepsis, and the fact that during the puerperium the muscle fibres are in a state of degeneration. Further, the surface of the wound is apt to be puckered and small pockets form between the stitches. The uterus never being at rest and the stitches being applied firmly to stop hæmorrhage also lead to an irregular cut surface and accumulations of blood between the edges. On the other hand, if the incision is made in the lower uterine segment there is less bleeding, the muscular wall is thin and easily brought together. This part of the uterus is at rest during the early days of the puerperium and so favours healing and a sound scar. So far there has been reported only one case of rupture of a scar in the lower uterine segment. I used this method in the last four Cæsarean sections I did, and I was much struck by the ease of the operation. A transverse incision was made through the peritoneum and the bladder pushed down; then the peritoneum was separated from the uterine wall above and drawn upwards and clamped to the parietal peritoneum. A longitudinal incision was made through the lower uterine segment, and what struck me then was the ease with which one grasped the head and drew the child out of the wound. There was no groping for a limb or the head as in the classical operation, and pulling out the child with a jerk. Munro Kerr makes a transverse incision through the muscle and delivers the child by expressing it with one hand behind the uterus, or he uses one blade of the forceps or a vectis to bring the head through the wound. The second point which impressed me was that a smaller incision was required as the muscle seemed to stretch readily and that without tearing. After removal of the placenta and membranes, the muscle wall was stitched with catgut and then the peritoneum also with catgut. Since for this latter a continuous suture was used, at the end of the operation one could see only a peritoneal wound of not more than 2 inches across. All the mothers and the children did well.

Much discussion has taken place as to the material to be used for suture. For many years I have used chromic catgut, and I have so far seen no reason to change it, for I have no experience of uterine rupture from a deficient scar. It seems to me that the imperfect scar depends on septic healing, and not on the material used. Eardley Holland strongly advocates the employment of silkworm gut. Others use silk and others linen.

There is no class of case in which it is more difficult to determine the best course to adopt than in the cases of obstructed labour which are "septic" or "suspect." In 1911 Dr Routh found that when Cæsarean section in cases which might be presumed septic was carried out the maternal mortality was 34·7 per cent., and in Holland's list of last year it is given as 27 per cent. These figures are rather deterring but not prohibitive. For my own part I have done at least six suspect cases and all have done well. In every such case thorough disinfection of the vagina and cervix should be carried out not only by douching but by swabbing. Further, after removing the placenta and membranes, I swab the interior of the uterus with eusol and then push packing also soaked in eusol through the cervix into the vagina. This is removed per vaginam at the end of the operation. It was Dr Davidson, our senior secretary, who suggested this procedure to me, and I carry it out now in every case of Cæsarean section, suspect or not. I notice that Blair Bell and Banister both recommend a similar method in papers in the last number of the *Journal of Obstetrics and Gynæcology*. Munro Kerr's method of removing the placenta per vaginam also strikes me as on the right line as a preventive of sepsis. Some advocate Cæsarean hysterectomy in suspect cases. I have never had occasion to perform the double operation in such. In this group of cases there are other possibilities, pubiotomy and craniotomy. The former has a distinct place in the management of such, and on the whole the maternal mortality is lower than in Cæsarean section. The patient must, however, be a multipara, and the operation is never one of election, but should be employed only after forceps have been tried and failed, and the case has therefore come to be classed as at least "suspect." Menge's figures are interesting. He records 104 cases of pubiotomy with no maternal deaths, and a fœtal mortality of only 6·7 per cent.—a truly wonderful record, and

yet the operation has never found much favour with British obstetricians.

Craniotomy is, of course, the last resort, and since the maternal mortality is only 6 per cent., it will always hold a strong position in the treatment of suspect cases. If we compare this with the mortality from Cæsarean section in such cases we find it is 27 per cent. This only shows us that our object must be to reduce the number of infected or suspect cases, to recognise the conditions present, and to determine early on a proper line of treatment which will save both mother and child, so that craniotomy will be reserved entirely for cases of hydrocephalus and cases in which the child is already dead.

From my experience of sixty cases of my own, and from many others at which I have assisted, I would advance the following conclusions :—

(1) In cases of pelvic contraction when the conjugate is not more than $3\frac{1}{4}$ inches, Cæsarean section is preferable to induction of premature labour.

(2) Recent experience of the lower uterine segment incision makes one hopeful that it may be an improvement on the classical operation.

(3) The freedom from risk of rupture of the scar appears to depend on absence of sepsis and careful suturing rather than on the actual material used.

(4) Cæsarean section is justifiable in selected suspect cases.

(5) The advantage of the operation performed before or early in labour over one carried out as a last resort is clearly shown by one's own results and by the figures quoted.

THE INDUCTION OF PREMATURE LABOUR IN CASES OF DISPROPORTION.*

By H. OLIPHANT NICHOLSON, M.D., F.R.C.P. (Edin.), Senior Assistant Physician, Royal Maternity Hospital, Edinburgh.

A GOOD many obstetricians at the present day disapprove of the induction of premature labour, mainly, I think, because in cases of contracted pelvis certain statistics seem to show that the mortality to children is greater after premature labour than in labour at full term. But when different labours in the same woman with a contracted pelvis are compared, the advantages of the induction of premature labour are very obvious, and in other cases of disproportion due to the excessive size of the fœtus induction is an ideal and perfectly safe method of treatment.

The first thing needed for the improvement of midwifery practice is to educate the public to realise clearly that difficult labour can in most cases be prevented. Patients must be instructed to come for examination before the end of the eighth month of pregnancy, and women pregnant for the first time should be seen at the end of the seventh month.

In our Maternity Hospital practice we now have the enormous advantage of antenatal examination in the large majority of cases which come into the Hospital for delivery. Dr Ballantyne and Dr Francis J. Browne endeavour to ascertain four things: (1) The size of the pelvis; (2) the size of the child; (3) the relative size of the child and the pelvis; (4) the position of the child.

The size of the pelvis is an important thing in a way, because if it is really small or flat that particular patient will always require to have something done to prevent difficult delivery. But as regards the question whether or not her pregnancy can be allowed to go to full term, a far more important thing is the relative size of the pelvis and child. Labour may be difficult either because the pelvis is too small, or because the child is too large; the indication for the induction of labour is not concerned with *absolute* measurements, but with relative measurements. To induce labour at a given week in pregnancy when the true conjugate diameter is estimated to measure a certain number of inches is quite wrong practice; a

* Read 8th March 1922.

flat pelvis will require a different calculation from a justo-minor pelvis. The date for the induction of labour should be chosen by carefully estimating by abdominal palpation the degree of ease or difficulty with which the head can be made to sink down into the pelvic brim. To do this satisfactorily the patient is put into a position midway between sitting and lying—the semi-recumbent position. Excessive size of the child is a very common reason nowadays for the induction of premature labour. An unduly large fœtal head seems to be a much commoner thing than it was twenty-five years ago, and in my opinion it may soon become quite sound practice to induce premature labour for this reason alone in many primiparæ, if the proportion of "still-births" in first-born children is to be diminished. A large head in a normal pelvis is the same thing as a normal head in a pelvis which is slightly contracted. It has been my practice for many years to induce labour from the thirty-sixth to the thirty-eighth week in practically all primiparous patients of between thirty-five and forty-five years of age. Benefit results to both mother and child, for labour is less lingering and dangerous, and there is a greater chance of a living undamaged child being born. In all obese women, where the pelvis is slightly contracted, or when children have been previously lost owing to excessive size, thyroid extract ($7\frac{1}{2}$-10 grains daily) has been given for the last two months of the pregnancy. Considerable benefit in the way of an easier labour has been obtained in this way; the thyroid may possibly reduce the weight of the fœtus, or, what is quite as likely, cause a very definite reduction of the tissues in the pelvis. When there is much solid œdema in the mother, and her whole physiognomy becomes altered, as is not uncommonly the case even in normal pregnancy, then thyroid treatment is quite safe and correct practice, and is likely to be followed by an easier labour if there is a slight disproportion in the size of the head to the pelvis

As regards the external measurements of the pelvis—inter-spinous, inter-cristal, and external conjugate—unless they are markedly under the average I think they give little information that is helpful in assisting one to form a decision as to the best method of dealing with a disproportion. The internal measurement of the diagonal conjugate is of course a far more important matter, but personally I do not believe that anyone can ascertain this accurately unless the patient is anæsthetised. Dr

Ballantyne always sends us a note of this measurement, and sometimes after a successful induction of labour we find that according to his estimate, we have delivered without difficulty a child of average size through a true conjugate of certainly not more than 3 inches! In a pelvis of normal size one cannot reach the sacral promontory without hurting the patient very considerably, and I am generally contented to conclude from this that there is no great pelvic contraction. Under chloroform one may be able to measure the size of the fœtal head in proportion to the brim of the pelvis in any particular case by the method introduced by Munro Kerr. One is able to estimate the amount of overlapping of the head in cases where it does not descend into the pelvic brim and this is far more valuable than the absolute size of the diagonal conjugate. Again I want to accentuate that in order to forecast the mechanical ease or difficulty of a given labour the essential thing to know is the relative size of the pelvis and the fœtal head.

The *position* of the child's head in the pelvis is also important when the question of disproportion arises, for it may not be the excessive size of the head which makes it fit badly into the pelvis. A head of pretty ordinary size lying with the occiput behind may fit very badly into a pelvis which has a true conjugate diameter of even 4 inches, and may give rise to an obstructed labour. Cases of this kind have been sent into hospital for craniotomy, and it is sometimes possible successfully to deliver living children, simply by correcting the abnormal position of the fœtus by means of manual internal rotation of its body and head. Some of the cases of disproportion sent to us from the antenatal department are occipito-posterior cases. They are commonly multiparæ with a history of one or more difficult labours, and perhaps the children have been lost during delivery. The question arises whether or not the shortly expected labour should be induced or allowed to go to full term, and the difficult thing to decide is just how much the persistent occipito-posterior position has had to do with the loss of previous children. That particular malposition is apt to repeat itself in successive pregnancies, but the up-to-date obstetrician can almost always convert such a type of difficult labour into a comparatively easy one and obtain a living child, unless the underlying cause of the malposition is really a slightly contracted pelvis which is not unusual. We have some difficulty in deciding about the best

treatment for some of these cases, especially when the examination is carried out without changing the O.P. position into an O.A. position. According to the late Dr Herman it is a simple matter when the child's back is not anterior to turn the child round (by pressing its shoulders in opposite directions) until its back is in front. Dr Ballantyne also recommends this, and certainly in marked instances of disproportion it should be done, if only to enable one to estimate where the real relative difficulty lies.

By insisting that patients should come for examination not later than the eighth month of pregnancy the sound practice of midwifery has advanced enormously, and most of the difficulties that arise in labour may be prevented. Every young practitioner must be taught the importance of abdominal palpation and auscultation, and it should be made a routine practice in every case at least a month before labour is expected. In a primipara, the head in normal cases has sunk into the pelvic cavity, while in a multipara it is more or less free above the brim. If the head is not engaged in a primipara, or if there is marked prominence of the uterine tumour, an internal examination should be made to find out why this is so. Contraction of the pelvic brim, malposition of head, or a child of excessive size may be the reason. At all events if this condition of relatively large head, or it may be, relatively small pelvis is recognised sufficiently early, one has the option of performing induction of premature labour, and I think this is the proper thing to do.

Suppose the pelvis is of normal size, then the disproportion must be due either to a malposition of the head, or to a child of excessive size. This class of case comes into hospital often enough at the eighth month of pregnancy, and if examination shows that the child is then as large as it should be at full term there is no doubt that the correct treatment is induction of labour. Such a child is not likely to be too feeble to survive. I believe, however, that in more than half the cases sent from the antenatal department into hospital (Oct. to Dec. 1921) on account of disproportion, there was some pelvic contraction. In a *primipara* if the contraction is slight, and the case is seen about the thirty-fifth week just at a time when the head begins to have some difficulty in sinking into the pelvic brim, I think induction of premature labour should be advised. I have quite made up my mind that it is not worth while,

as a rule, to induce labour much before the thirty-fourth week, except under extremely favourable conditions as regards the subsequent care of the child. I much prefer to wait, as is often possible, till the thirty-sixth week, and then the main objection to premature delivery — the loss of the child—is generally obviated. If the disproportion at thirty-four weeks is so great that the fœtal head cannot be pushed into the brim the most satisfactory treatment will be Cæsarean section at term. If the patient is a *multipara*, a great deal of valuable information can be obtained from the history of the previous labours, and it is much more easy to come to a decision as to correct treatment. If there has been difficulty with the early children the difficulty is apt to increase progressively, because I am sure the children tend to become bigger. If the first child has been a female, born alive with some difficulty, it may sometimes be necessary to induce labour for a second baby of larger size—which may be a male. From the point of view of the mother it is better to err on the side of inducing labour too soon rather than of waiting too long.

If the induction of premature labour is selected for a case of disproportion, the general practitioner can perform the operation —if operation it can be called—as easily and as successfully as the specialist.

Nowadays for the mother a premature labour is quite a simple and a perfectly safe procedure. There should be no greater risk than when Nature starts the process; no other alternative is nearly so safe, and there is no blemish left behind, as after Cæsarean section or pubiotomy. The surest way, and for most cases, the best way to induce labour is by separation of the membranes from the uterus. This is the simplest way to imitate Nature. In a multipara one can almost always get a finger into the internal os, and it is easy to detach the bag of membranes from the decidua all round the lower pole of the uterus as far as one can reach. This is done if possible between the "painless contractions" which go on rhythmically in the later months of pregnancy. When the adhesions have been broken down in this way the bag of membranes is capable of protruding through the open os, and labour gradually comes on. In primiparæ it is more difficult to carry out, because the cervical canal will not often admit the finger, but it is easy and quite safe to pass a few Fenton's metal dilators through the internal os, and then one can proceed as in a multipara. I

carry out this method in the following way and often without an anæsthetic; in many multiparæ it is done under the guise of a vaginal examination. Sometimes, but not as a rule, a weak antiseptic douche is given, and the vulvar parts and the hands of the practitioner must be as carefully prepared as for any obstetrical operation. The patient lies on her left side with her legs drawn up, and with her back parallel to the top of the bedstead. Then the left hand is used as it fits into the hollow of the sacrum, and can reach higher than the right hand. It is generally possible to hook the middle finger into the os, pull it downwards, and detach the membranes over a considerable area, chiefly anteriorly. The right middle finger may sometimes be used to do the same thing posteriorly. If the internal os is unusually high up, and beyond the reach of the finger, a large-sized Fenton's dilator will act equally well as a separator of the membranes. After its use the finger can complete the necessary separation. It is advisable to separate extensively enough to cause a definite "show" of blood. The patient should then get up and walk about, for in the erect posture the bag of waters, now freed of its adhesions to the decidua, and lying loose in the lower segment, can sag down into the open cervical canal. Quinine hydrochlor. in 5-grain doses may now be given every four hours to stimulate uterine action; commonly I give this drug for twenty-four or thirty-six hours previous to the local interference. Labour pains may become brisk within twenty-four hours. Often enough, however, the next day passes with no apparent signs of impending labour, yet on examination it will be found that the internal os is slowly dilating, that the first stage is really going on painlessly. Labour is going on as comfortably as it does under the morphia-scopolamine narcosis. It is now possible to separate the membranes still higher up by the same method, and this should be done if one wishes to accelerate the labour gently. Otherwise the first stage may sometimes last over three or four days, and on examination the os is found to be four-fifths of its full size, with the bag of membranes bulging down, and yet there are no strong or painful contractions. Rupture of the membranes is then the correct treatment and the case is satisfactorily ended, possibly with the help of pituitary and forceps.

This is an ideal method in multiparæ, when there is no great urgency—just to detach the membranes from the entire lower segment by several examinations if necessary; wait

for the first stage to advance pretty fully, then rupture the membranes and deliver.

In a primipara, still choosing separation of the membranes as one's principle, I think it is generally advisable to employ a method which not only detaches the membranes but also leaves a foreign body inside the uterus. I believe that a gauze packing placed directly into the lower uterine segment is the best method, and involves less interference than the common practice of passing bougies into the uterus between the membranes and uterine wall. The bougie separates a long strip of membrane along its track, which is not nearly so natural a thing as a good detachment from the lower segment. The method of packing is as follows. The patient lies on her side as already described. Chloroform is not always necessary, but a more complete operation is possible if it is used. In a primipara the os is, if necessary, opened up with two or three Fenton's dilators till it will admit the point of a curved metal cannula packer, which is passed as easily as a uterine sound. When the end of the packer is inside the cervical canal and held in position with the fingers of the left hand in the vagina, ribbon iodoform gauze from a spool is passed by means of a stylet directly into the lower segment, till a packing the size of a small orange lies there. As the gauze is packed in it mechanically lifts the membranes off the lower uterine segment. When contractions occur—in twelve to twenty-four hours—the packing is removed, and the bag of waters drops into the open os to act as a dilator. The only disadvantage of this method, and indeed of any method, is the delay that may occur before labour becomes brisk. The fact that each uterus has its own personal equation of "irritability" explains this. The delay can be shortened by further dilatation of the os, and the introduction of the de Ribes bag is the best way to do this in very obstinate cases. During last November at the Maternity Hospital, seventeen cases of disproportion, many of them sent to us by Dr Ballantyne, were induced successfully by this method, while several others, seen by both Dr Hugh Davidson and myself, were quite obviously only suitable for Cæsarean section or pubiotomy. The fact that we performed four Cæsarean sections within thirty-six hours does not suggest that we are too much enamoured of induction, though personally I confess that I think it is a procedure which might be more

often carried out than it is, if the indications were more precisely stated.

Cæsarean section is the simplest and easiest, and ought to be the safest of all abdominal operations, for one is dealing with healthy, not diseased, tissues. With good luck the mortality might be nil, but sometimes, when every apparent care has been taken, the patient may be lost from hæmorrhage or peritonitis.

But in Cæsarean section the general condition of the patient is one of the most important factors in a successful result; the operation so safe in a healthy normal woman is most deadly when the patient is exhausted after a lingering difficult labour. That is why I think it is generally unwise to carry out this operation as a last resource, perhaps after forceps has failed, though both Dr Lamond Lackie and Dr Hugh Davidson have certainly had a surprising amount of success in cases of this kind.

Cæsarean section has one other advantage — it can be followed, if desired, by sterilisation of the patient.

Pubiotomy subjects the mother to a considerable risk, and in addition her pelvis sustains a definite injury. One should never "arrange" to do this operation at a fixed date, but it may sometimes be considered as an alternative to craniotomy in a hopeless forceps case.

Craniotomy on the living child is still necessary, and is indeed the only good practice, in certain cases of obstructed labour with tonic contraction, if one considers what is best for the mother.

Discussion on Papers by Dr Lackie and Dr Nicholson.

Dr Ballantyne remarked on the enormous field of discussion opened up by the papers of the President and Dr Nicholson. He referred to the relative frequency of Cæsarean section in our own hospital here in Edinburgh. Last year in the Autumn quarter there were 12 cases, the year before 8, the year before that, when the speaker was in charge, there were 6, while in previous years there were never more than 2 or 3 in his quarter. This meant that the operation had gained a large amount of popularity amongst obstetricians, and was evidently meeting requirements. Cæsarean section had gained in reputation whilst craniotomy had become very unpopular. Dr Ballantyne had heard a good many discussions on

Cæsarean section, but he did not remember the question of the life of the fœtus having been put forward so prominently on previous occasions. It had always been the welfare of the mother that had been considered and very little had been said about the babies.

Dr Ballantyne referred next to the influence which the Ante-Natal Department had had in increasing the number of Cæsarean sections and in diminishing the frequency of craniotomy and high forceps. In the V.D. Department Cæsarean section and the induction of labour had to be considered from a different standpoint. He had performed one Cæsarean section in a woman with a true conjugate of 3 inches; she had had a positive Wassermann reaction, but under treatment the reaction had become negative. The operation was successful and the recovery uneventful. The baby was healthy and strong and was quite one of the "show" babies of the department. Twenty years ago such a case would have resulted in the birth of a macerated fœtus. Cæsarean section, however, was not usually advisable in cases of gonorrhœal infection. There was always the risk that when the uterus was opened there might be spilling of the liquor amnii containing gonococci into the peritoneum causing infection. The gonorrhœal cases were best treated by non-instrumental methods of induction, and some very successful results had followed the use of quinine and pituitrin in the department. The use of bougies brought with it the risk of infecting the uterus from the vagina.

Dr Haig Ferguson said that the speakers had gone into the whole subject of the induction of labour and Cæsarean section very fully, and that the comparative safety of the latter operation had been well emphasised. He thought Dr Lackie had not been quite clear in stating that the indications for Cæsarean section in pelvic contraction depend not so much upon the actual pelvic measurements as upon the relative proportion of the fœtal head to the individual pelvis.

As regards the question of accidental hæmorrhage, Dr Ferguson had never found it necessary to perform Cæsarean section for such cases—possibly because he had never met with a sufficiently serious case.

In eclampsia Cæsarean section should only be undertaken in exceptional cases. No mention had been made of vaginal hysterotomy in cases of eclampsia about the seventh month, especially where the woman's condition was very serious with a rigid and undilated cervix. Dr Ferguson had saved several patients in such circumstances by so-called vaginal Cæsarean section, which has the advantage that it can be done safely in almost any surroundings.

Dr Nicholson had stated very clearly the indications for the induction of premature labour. Dr Ferguson did not think premature labour should be induced earlier than four weeks before

full time with a reasonable hope of having a living child. The main point in induction is not so much the smaller size of the head, as its greater capacity for moulding and accommodating itself to the narrowed pelvic diameters. An ideal induction of premature labour should terminate with a living child by the natural powers. In his experience premature children stand operative interference badly. Dr Ferguson pointed out that in many cases nature in effect induces premature labour. Take for instance a slightly flat pelvis in a primipara. The head is pushed through the brim in the last month of pregnancy and develops in the cavity of the pelvis till labour sets in. In subsequent labours when the head has not been pushed thus early through the brim, dystocia results when full-time labour supervenes. He had seen several instances illustrating this observation. The history of an easy first labour does not therefore necessarily mean easy subsequent labours even when the conditions as regards size of child, presentation, and position are approximately similar.

Dr R. W. Johnstone thought that Dr Lackie's paper gave a very accurate and fair representation of the position which Cæsarean section held in the practice of the Edinburgh School. With regard to the induction of premature labour he thought that with an average sized head a C.V. of $3\frac{1}{4}$ inches was absolutely the smallest pelvis in which one should contemplate the operation. He was interested to hear what Dr Nicholson said with regard to induction of labour at term (not premature), for he had been impressed from time to time with the undesirability of allowing pregnancy to go on much beyond full time. He had seen several cases in which a child had been lost as a result of this, and he had lately had such a case in which Cæsarean section was necessitated. The patient was a primipara and the presentation a breech. The mother's pelvis was narrow, diagonal conjugate of 4 inches, and lastly the patient was a month past her full time. The patient had been thirty-six hours in labour when he saw her, and the membranes had been ruptured for twenty-four hours; the child was obviously a large one but was alive and its heart beating regularly. It was felt that from the size of the child and the pelvis and the undilated condition of the vagina, the chances of obtaining a living child *per vias naturales* were remote and that the risks to the mother were considerable, no matter what the form of delivery undertaken. Cæsarean section was therefore performed and a lusty child of $9\frac{3}{4}$ lbs. obtained. The mother is making a satisfactory recovery although the early puerperium was febrile. He was interested to notice that in eclampsia Cæsarean section was losing favour, because an operation which permitted of the almost immediate removal of the placenta should, theoretically, be exceedingly successful if the modern views of the etiology of eclampsia were at all correct. Probably the bad results were partly due to the

toxic condition of the patient who was unable to resist the shock and to the operation being done too late. Practically all operative treatment in eclampsia suffered from this latter drawback and this constituted a fallacy in comparing operative with non-operative treatment. To get a correct idea of the value of operative treatment it should be undertaken at once—as soon as the condition is diagnosed—or not at all.

With regard to placenta prævia the question of the position of Cæsarean section rests very largely on the outlook for the fœtus. Unquestionably a larger number of living children can be obtained by Cæsarean section, but he would like to know how many of these children are so premature as to succumb in the early weeks of infancy. In other words, the infantile mortality should be taken into consideration in assessing the position of this operation in placenta prævia as well as the immediate fœtal mortality.

Dr Keppie Paterson spoke of the difficulty experienced in estimating the disproportion of head and pelvic brim by those who had not had large hospital experience in dealing with more or less borderland cases of contracted pelvis. One of his patients had a small justo minor pelvis and after explanation of the condition, he arranged to induce labour on a certain day. Labour, however, started naturally through fright before that date. The same occurred in three successive pregnancies, but in the fourth, artificial means had to be resorted to. Another had labour induced by a good hot bath and a dose of castor oil. He was interested in Dr Nicholson's method of gauze packing. After discarding Champetier de Ribes bag for years, he had recently used it, but only by careful insertion of the extreme end of it inside the os after separation of the membranes as far as the finger could reach, with good results. He suggested the insertion of a semi-hard rubber instrument shaped like the cup of a cup-and-stem pessary, but of much larger size; the presence of this foreign body might induce good pains after separation of the lower membranes. At his clinic he thought it was advisable to ask the size of the father, as a determining factor to be considered in estimating the growth of the child. The age of the father did not seem to count. He had attended a patient of over forty with her first child. Her husband was fifteen to twenty years older. She was a large woman with a large pelvis, but her child was so preternaturally large that Dr Haultain performed craniotomy after prolonged labour. On induction of premature labour in the second pregnancy at about three and a half weeks before carefully estimated time, Dr Paterson had great difficulty in delivering an unusually large child with high forceps.

Dr Rose agreed that the heavy mortality in eclampsia is due to the operation having been performed too late. She had seen a fair number of cases—at least 12—treated by Cæsarean section in the early

stages of labour and with no dilation of the os, and she did not remember a single baby being born dead. Two at the outside had died before leaving the hospital. One of the mothers died, but this was owing to a cerebral hæmorrhage and the operation had nothing to do with it. One mother became hopelessly insane, but the other cases all got on remarkably well.

Dr Theodore Haultain asked Dr Nicholson in how many cases of induction he was successful by merely separating the membranes, as he had carried out the procedure at full time with only fair success. As regards the use of quinine and pituitrin to bring on labour he had given these drugs combined with castor oil according to the method prescribed by the Dublin School, on the expected date of confinement, but in 24 cases only 12 went into labour within the succeeding forty-eight hours, and with a second administration of the treatment only another 4 began labour. The treatment seemed to have the effect of lengthening the first stage unduly.

The President, in reply, said he had many times used gauze packing with success to induce labour and thought it was just as good as the bougies, but one objection was that in every case the patient had complained of pain when the gauze was being extracted. He was particularly interested in what had been said about "suspect" cases and Cæsarean section. The practice of washing out the uterus with eusol in such cases was on the right lines.

As to Dr Johnstone's question with regard to infantile mortality, the figures shown referred only to fœtal death. To get at the infantile mortality was not nearly so easy. In conclusion, he again wished to emphasise his opinion that more borderline cases should be treated by Cæsarean section than were at present.

Dr Nicholson said that he had been rather misunderstood by the President if it had been inferred that he recommended induction of labour as early as the thirty-fourth week. He very rarely advised this unless the child could be very specially cared for; he waited till the thirty-sixth week. He had never found the gauze packing fail to bring on labour, but one might have to wait three or four days in some cases, if the uterus was difficult to start into action. He always removed the gauze in twenty-four hours, but occasionally had to pack a second time.

EXHIBITION OF SPECIMEN.*

Dr R. W. Johnstone showed a specimen of **Uterus Didelphys**, which was obtained post-mortem from a patient who died of eclampsia. It was discovered quite accidentally in the course of delivery that the vulva was septate, the septum running antero-posteriorly and that there was a complete double vagina and double cervix. The condition gave rise to no difficulty during the forceps delivery, but it was noticed after the completion of labour that there was a swelling on the side of the uterus which suggested the probability of the duplication of the uterus extending to the corpus. The patient, who was comatose on admission, remained so in spite of all treatment for four days, when she died. Owing to a misunderstanding the pathologist at the time of the autopsy removed only the uterus and cervix, which were now shown. The section of the uterus showed a complete septum extending from the fundus to the external os. The puerperal half showed the normal changes of the puerperium, while the non-impregnated half was filled with a thick decidua.

Dr Ballantyne said that there were three types of double uterus, the uterus septus, the uterus bicornis, and the uterus didelphys, and of these the last named was by far the rarest. He had not himself seen one in hospital practice. Dr Johnstone's specimen, therefore, was first of all important because of its rarity, and secondly because of the support which it gave to a reflection which he had often made, that however perfect one's diagnosis might be in obstetrics, a malformation of the uterus caught one out sometimes. Some very interesting examples of errors in diagnosis had been recorded from time to time all due to malformations. Dr Johnstone's specimen differed from Dr Gemmell's, in which there was also a double vulva.

PRIVATE BUSINESS.*

Mr J. W. Struthers, M.B., Ch.B., F.R.C.S., was elected a Fellow of the Society.

A motion by the Council—"That Dr Haig Ferguson, Dr W. Fordyce, and Dr Macrae Taylor be appointed Trustees to hold the Society's Investments," was passed.

* Meeting held 8th March 1922.

ICTERUS NEONATORUM.*

By E. FARQUHAR MURRAY, M.D., F.R.C.S. (Eng.),
Newcastle-upon-Tyne.

THE occurrence of jaundice in the newborn is so frequent and the theories put forward to explain it so various, that the following observations were made in the hope of throwing further light on the subject.

Number of Infants Examined.—Over 300 infants (337) were studied. The total number was composed of two large series of consecutive births. No blood tests were made for syphilis, reliance being placed upon the absence of any clinical evidence of the disease in either the mother or child. It was not possible to make a post-mortem examination on the five children (all under 5 lbs.) who died jaundiced.

(1) *Number Jaundiced (all weights).*—68 per cent. were jaundiced. This varied considerably in degree. In mild cases it consisted of a sallow appearance of the face, lasting about twenty-four hours, which was quite distinct from the pink colour present at birth or which succeeded it. In severe cases, the jaundice was marked and lasted much longer and the infant was in the drowsy and sluggish state so typical of the condition. All intermediate degrees were found.

(2) *Relation of Birth Weight to Incidence of Jaundice.*—Small and premature children are specially prone to develop jaundice, while large children are not so liable. The incidence of jaundice was therefore estimated for children of different birth weights.

Weight.	Per cent. jaundiced.
3 to 4 lbs.	100
4 „ 5 „	100
5 „ 6 „	76
6 „ 7 „	73
7 „ 8 „	53
8 „ 9 „	36
9 „ 10 „	71

This table shows the intimate relationship which exists between the birth weight of the child and its liability to become jaundiced. It explains also the different percentages given by authorities of the incidence of jaundice; a series of births of premature or small infants giving a high figure and a run of large children a low one. In making observations on this

* Read 10th May 1922.

subject therefore, all results should be obtained by grouping together children of similar birth weights. Except where specially noted, this method has been adopted in this paper. The apparent discrepancy in the result for babies of 9 to 10 lbs. is partly explained by the small number available in the series, but also by Obs. 12 (*q.v.*).

(3) *Date of Onset and Duration* (*all weights*).—While the typical yellow appearance might not be present for two or three days, evidence of its onset could be detected much earlier in the form of a faint sallow tint. Taking this as the date of onset, the result for the total of jaundiced infants was as follows:—

Onset 1st day after birth . . .	59 per cent.
„ 2nd „ „ . . .	37 „
„ 3rd „ „ . . .	3 „
„ 4th „ „ . . .	1 „

Similar results were obtained for specific birth weights. Children of 7 to 8 lbs.

Onset 1st day	65 per cent.
„ 2nd „	35 „

Duration of Jaundice.—The shortest period was twenty-four hours, while the longest persisted up to discharge from hospital on the tenth day. In the majority all evidence had disappeared within a week, and those discharged and still somewhat yellow were rapidly improving in colour and were otherwise perfectly fit. In a few cases, and these usually premature infants, the stay in hospital was extended.

(4) *Relation between Date of Onset and Duration* (*all weights*).

	Duration.
Onset 1st day after birth . . .	6 to 7 days.
„ 2nd „ „ . . .	5 „ 6 „
„ 3rd „ „ . . .	2 „ 3 „
„ 4th „ „ . . .	2 „

This suggests that infants in which the onset is delayed till the second, third, and fourth days are offering a definite resistance to its onset and that they certainly escape with a milder attack.

(5) *Effect of Jaundice on Child.*—The following suggests that jaundice is positively deleterious to the infant.

The children of given birth weights were divided into jaundiced and non-jaundiced groups, and the percentage of

each group which had regained their birth weight on discharge from hospital (tenth day) was noted.

Weight.	Per cent. regaining birth weight on discharge. Jaundiced.	Not jaundiced.
6 to 7 lbs.	61	69
7 „ 8 „	45	56
8 „ 9 „	30	40

Apart from the effect of the jaundice on the child, the table shows the natural slowness of large children to regain their initial birth weight.

(6) *Climatic Influence.*—Equal numbers of children of the same birth weight were studied during cold and warm weather. It will be seen that the liability to develop jaundice is rather greater in the colder months.

	Per cent. jaundiced. May.	January.
26 children (6 to 7 lbs.)	65	77
32 „ (7 „ 8 „)	56	59

(7) *Sex Influence.*—Analysis of the cases showed no possible sex relationship; the numbers developing jaundice being in keeping with the proportion of male to female children born in the hospital.

(8) *Prematurity.*—The marked tendency for premature children to become jaundiced would lead one to think that prematurity *per se* was the causal factor. This was disproved by examining the second series of children, 94 of whom had jaundice. Only 10 per cent. of the jaundiced were from clinical examination considered to be premature.

(9) *Umbilical Absorption.*—The treatment of the cord and umbilicus was uniform. None of the babies had evidence of umbilical sepsis. Gross sepsis can certainly be excluded and it would without doubt prove fatal. Moreover, the jaundice commenced some days before sepsis would be evident, and certainly before absorption could occur from the raw surface after separation of the cord. The possibility of absorption of some harmful product from the cord during the process of desiccation prior to separation was investigated as follows: Babies with the normal length of attached cord were compared with babies of similar birth weight in which the cord was ligatured at the skin junction. The results as regards incidence of jaundice were similar.

(10) *Breast v. Bottle.*—The method of feeding was studied,

but there did not appear to be any difference as regards liability to jaundice.

Relation of Blood Content of Infant to Incidence of Jaundice.—The relationship noted clinically and (proved by Obs. 2) which exists between the size of the child and its liability to jaundice suggests that if this is of a hæmolytic nature, then perhaps the "serum content" of the child plays an important part in the process. It is obvious that the only possible variation in the blood or serum content of the child apart from its actual size at birth, must depend on the amount of blood which passes from the umbilical vein and placental vessels into the child before the cord is ligatured. A healthy infant placed on the scales immediately after birth and before ligature of the cord, has been shown to gain in weight up to several ounces before pulsation has ceased in the cord. This represents blood passing into the child's circulation from the cord and placenta. Two mechanisms effect this:—(1) Aspiration of the thorax and opening up of the pulmonary circulation. (2) Uterine contractions squeezing the placenta and expressing blood from the sinuses into the umbilical vein. Both processes can be readily demonstrated by manipulation of the cord. At times, apparent obstacles to the passage of blood may be seen to form in the umbilical vein. These are probably the result of exposure causing contraction of the vessels. In these further observations, the infants were divided into three groups in which, from the manner of separation, it was possible to form a rough estimate of whether, at the moment of separation, they had received a normal amount of blood, a subnormal amount, or an actual excess.

Group I.—The child was healthy, had cried freely, and had been left attached to the placenta until pulsation had ceased except close to the umbilicus. These infants were considered to have a normal blood content.

Group II.—These infants were removed earlier than usual. In some cases due to asphyxia, early separation of the placenta, some maternal indication Cæsarean section babies, and in a few cases earlier than usual without one of the above indications. These children were considered to have a subnormal blood content.

Group III.—In this group every endeavour was made to increase the amount of blood passing into the child's circulation. The child was stimulated to cry. The umbilical cord was gently milked towards the child in order to get the maximum

amount out of the placental vessels and down to the child before any constrictions appeared in the umbilical vein. The process of squeezing the cord was done close to the vulva. In some cases the uterus with its contained placenta was gently squeezed. That it is possible by this means to increase the child's blood content was shown by exhausting the placentas including the attached portion of cord of the residual blood and measuring it. A number of tests were made.

(11) Note was made of the weight of the child and its method of separation. The table shows clearly that early separation deprives the child of blood and also that it is possible to add to the child's blood content.

		Placental content in cubic centimetres. Blood content of child.	
Weight.	(Sub) Normal.	Normal.	Normal (plus).
3 to 4 lbs.	...	19	13
4 „ 5 „	19	39	9
5 „ 6 „	27	22	23
6 „ 7 „	47	24	24
7 „ 8 „	46	29	22
8 „ 9 „	48	30	22

Children of 7 to 8 and 8 to 9 lbs. show the point clearly.

(12) *Effect of Alteration of Blood Content on Incidence of Jaundice.*—The table shows that infants with a subnormal blood content are more liable to jaundice.

	Per cent. showing jaundice. Blood content.	
Weight.	(Sub) Normal.	Normal.
5 to 6 lbs.	93	65
6 „ 7 „	75	74
7 „ 8 „	49	46
8 „ 9 „	47	26
9 „ 10 „	100	33

The high figure for infants of 9 to 10 lbs. referred to in Obs. 2 is now explained. It will be seen that the incidence of jaundice for infants of that size, if of normal blood content, is 33 per cent. This would be in perfect harmony with the rest of the table in Obs. 2, in which the infants were divided into groups merely in relation to their birth weight and not related to their methods of separation. As mentioned at the time, there were not a large number of big babies available, and as so many of these had to be separated early owing to asphyxia following a difficult labour, the incidence naturally appeared unduly high.

(13) *Duration of Jaundice to (Sub) Normal v. Normal Blood Content.*

Weight	Average duration of jaundice. Blood content. (Sub) Normal.	Normal.
5 to 6 lbs.	7½ days.	7¼ days.
6 „ 7 „	6½ „	4½ „
7 „ 8 „	7 „	5½ „
8 „ 9 „	8 „	6 „

The above tables show clearly, therefore, that an initial subnormal blood content renders the infant more liable to jaundice and to a more severe attack should it develop. It also serves to explain why asphyxiated babies are so prone to jaundice. The asphyxiated state and inevitable early separation results in their starting life with a subnormal blood content. It also contradicts the assertion that the jaundice is due to breaking down of "superfluous" red-blood corpuscles, the children with most blood and therefore most blood corpuscles being less likely to become jaundiced. This is further confirmed by the next observation, in which the incidence of jaundice in children with a normal blood content is compared with that of those in which the supply of blood has been increased. The latter are less liable to jaundice. This is not shown in every instance, but in the majority of the following examples—

(14)

Weight.	Per cent. showing jaundice. Blood content. Normal.	Normal (plus).
5½ to 6 lbs.	80	100
6 „ 6½ „	67	50
6½ „ 7 „	82	78
7 „ 7½ „	52	50
7½ „ 8 „	40	75
8 „ 8½ „	47	33

(15) As it appeared important to obtain further proof of the part played by blood serum in the process, the method which suggested itself was to add serum to those babies whose content was already normal (plus). This was done by injecting into the stump of the umbilical cord 2 c.c. of normal horse serum.

Weight.	Per cent. jaundiced. Blood content. Normal (plus).	Normal (plus) and Serum.
5½ to 6 lbs.	100	0
6 „ 6½ „	50	0
6½ „ 7 „	78	33
7 „ 7½ „	50	25
7½ „ 8 „	75	60
8 „ 8½ „	33	50

While the number of infants in which this was tested was small, it would seem as if there was ground for supposing that the serum was of value, especially as babies of small weight are so sensitive to jaundice. The actual figures for the different weight groups of injected babies were:—

5½ to 6 lbs.	1
6 „ 6½ „	3
6½ „ 7 „	3
7 „ 7½ „	4
7½ „ 8 „	5
8 „ 8½ „	2

Summary of Observations.

1. 68 per cent. show jaundice. This figure is a variable one.

2. Its onset is on the first, second, third, and fourth days after birth. Most commonly the first, and rarely delayed till the third or fourth.

3. The duration varies from twenty-four hours to several weeks (?) most commonly less than a week.

4. An early onset is usually associated with a more severe degree of jaundice, while a delayed onset presages a milder attack.

5. The jaundiced state is unfavourable to the infant.

6. There is a definite relation between the size of the baby and its liability to jaundice. The tendency is greater in small and less in large children.

7. The amount of blood obtained from the placental circulation before ligature of the cord definitely influences the incidence of jaundice. A normal amount or an excess is antagonistic, while a subnormal amount predisposes.

8. All observations on this subject should therefore be made by comparing babies of similar birth weight and methods of separation.

9. Cold predisposes the infant to jaundice.

10. Prematurity *per se* is not a causal factor except that such babies are small and usually weak, and therefore of small blood content.

11. Asphyxia is a factor in that the babies affected commence life with a low-blood content.

12. Sex, the umbilicus and the methods of feeding can be excluded from the etiology of simple icterus neonatorum.

Theory of Causation.

The theories are numerous. Some hold that it is a hæmolytic jaundice, and point out the marked difference between it and adult jaundice in that the sclerotics escape, the urine does not contain bile salts or pigments, and the stools remain unchanged. Others state that it is a true jaundice, and have found bile salts and pigments in the urine and in the body fluids. The unaltered stools are explained by such theories as that the bile pigments absorbed by the portal vein are passed into the general circulation through a patent ductus venosus. The jaundice has been attributed to alteration of pressure in the hepatic capillaries allowing an absorption of new-formed bile. Choking of the bile ducts by viscid bile has also been given as a reason. Many other theories exist. A third group suggests that it is a combination of processes, first a hæmolysis and then a true jaundice, due to excessive activity of the liver in dealing with the products of disintegration of the red cells. In order to discuss these theories in detail it would be necessary to bring forward evidence of extensive post-mortem examinations and analyses of urines. Such is outside the scope of this paper. It is, however, possible to indicate that the above investigations indicate that the primary process is one of hæmolysis. The evidence in favour of this is:—

1. That the jaundice is no mere chance occurrence, but is definitely related to the size of the child and its blood serum content.

2. The later the onset of jaundice the milder is the attack; this suggests that the infant resisted the process and had neutralised the bulk of the hæmolytic agent. Had it been true jaundice, it is difficult to explain why the attack should be of shorter duration. Certainly an onset on the third or fourth day excludes a patent ductus venosus as a cause.

3. The observations definitely show that the blood serum is a deciding factor. The greater the serum content, the less the likelihood even with children of similar birth weight.

4. While fœtal red-blood corpuscles are more friable than adult red cells as tested by their resistance to hæmolysis in hypotonic salt solution, the jaundice is not due to a mere passive breaking down of these cells.

Hæmolytic Agent.

It commences to act within the first twenty-four hours after birth. It is reasonable to assume that it is present in every baby, although rendered inert in some. Since the amount of nourishment which it gets from the mother in the first twenty-fours hours is negligible, and as there is no difference between breast- and bottle-fed babies, it would appear that it is formed within the child. The changes occurring in the new-born infant in the early days are profound. Until breast-feeding is established, it would certainly starve unless it had a good reserve of easily oxidisable fats. The baby of a week old crying loudly for its copious feeds at short intervals is in strange contrast with the baby, which, during the first twenty-four hours or more sleeps peacefully and appears to be satisfied with the few drops of colostrum which it gets with difficulty from the mother's breast. The drowsy condition of some of the jaundiced babies, and the distinct smell of acetone which was noticeable in the breath, suggested that perhaps there is a condition of acidosis. The oxidation of fats while it is living on its food reserve must liberate fatty acids. These are fixed by the alkalies in the serum or further oxidised into CO_2 and H_2O. Failure to neutralise these acids would result in them passing into the general circulation and causing hæmolysis.

In favour of this theory one would instance the effect of cold on the incidence of jaundice. The increased metabolism necessary to keep up the body temperature would result in increased oxidation of fats and consequently increased production of fatty acids. Again, the premature infant is one in which the processes of development are extremely active, while, owing to the absence or deficiency of subcutaneous fat it has to make special efforts to maintain its body temperature. In addition it has a poor serum content.

In conclusion, therefore, it is suggested that the initial process at work is one of hæmolysis. The hæmolytic agent is the outcome of the early metabolic processes in the infant, and probably of the nature of a fatty acid. Its presence in an active state is due to incomplete neutralisation by the blood serum the result of excessive production of hæmolytic agent or a deficient supply of serum.

The observations show the great importance of a normal blood content for the child. Therefore where early separation

is necessary the cord should be ligatured as far from the child as possible, so that when it revives it can aspirate the blood in the attached cord.

Icterus neonatorum, so called physiological, is frequently described as of no importance. This may be very true of the majority of babies, but a study of premature babies gives the impression that the jaundiced state may quite readily tilt the balance against its chances of survival. In view of the above findings it may reasonably be asked whether it would not be advisable to supply such babies with serum or blood obtained from the mother, or by aspirating the residual blood in the placenta or even normal horse serum.

Discussion.

Dr Ballantyne thought Dr Murray was to be congratulated on his boldness in venturing into this subject at all, because anyone who had looked into the literature on icterus neonatorum might be tempted to turn away appalled by the variety and divergences of opinion. There might almost be recognised a national cleavage of opinion, for the German writers, especially Ritter von Reuss, treated with scant respect the French view that icterus was hæmatogenous in origin, and held that it was hepatogenous.

Dr Ballantyne congratulated Dr Murray on his good sense in giving the larger part of his research to matters which made a practical appeal. We are not at present able to come to a definite conclusion as to the causation of the disease. He was interested in the suggestion that it might be of hæmolytic origin, but was afraid that it was only one of many theories. The first twenty-four hours after a baby's birth were very complicated; there were influences acting on it from ante-natal life; there was the result of the traumatism of birth; and there was the readjustment of functions to environment. The newborn must be very easily upset. But apart from theory, the value of the paper was that Dr Murray had seized hold of clinical facts which were verifiable and had drawn deductions which were justifiable. These deductions might help in understanding this disease. Dr Ballantyne remarked that it was interesting that in the V.D. section of the ante-natal department of the Royal Maternity Hospital there had only been one case of *severe* jaundice in an infant since the department was opened two and a half years ago, and with syphilitic parents one would almost expect jaundice to be rather common.

Dr Ballantyne said that it would be interesting to test some of Dr Murray's suggestions for preventive treatment, such as cutting

the cord long, and that might be done especially in Cæsarean sections.

Dr John Stevens asked the percentage of deaths in icterus neonatorum. His impression was that the disease was becoming less frequent. As regards treatment, was there anything better than grey powder?

The President (*Dr Lamond Lackie*) remarked on Dr Murray's theory with regard to delay in cutting the cord. One used to think that if the child were attached too long it was absorbing blood which would result in jaundice, but if Dr Murray's view were correct, by leaving the baby attached, one not only prevented jaundice but also added to the weight of the child.

He conveyed to Dr Farquhar Murray the thanks of the Society.

Dr Farquhar Murray, in reply, said that what he had said with regard to the hæmolytic agent and the therapeutic injection of serum was largely speculative. He had hoped to show the importance of a sufficiency of blood in preventing jaundice. He quite agreed that the disease might be of toxic origin. In connection with Dr Ballantyne's remarks he described his method of cutting the cord. There was nothing better than grey powder in the treatment of ordinary cases, but he felt that something more should be done for the severely jaundiced premature baby.

OMPHALORRHAGIA WITH A RECORD OF TWO CASES.*

By DOUGLAS MILLER, M.B., F.R.C.S.E.

IT is merely to put on record two cases of a comparatively rare condition that I have ventured to bring this communication before the Society to-night. Both these cases occurred in the Royal Maternity Hospital in Dr Lamond Lackie's Quarter in 1920, one on the 29th September, the other on the day following.

The first, an 8½ months male infant, 6 lb. 8 oz., after a normal delivery remained apparently healthy until the third day when free oozing was noticed from the umbilicus. The stump was normal and the cord not separated. Acupressure with crossed needles was resorted to at once with good effect. Three days later the needles were removed. There was no recurrence of hæmorrhage and the child was discharged well.

The second case is of greater interest. The child, a female, weight 6 lb. 4 oz., born spontaneously a few days before full time, was apparently healthy till the afternoon of the eighth day, when the cord separated. This was followed by a sharp hæmorrhage from the umbilicus. A firm pad soaked in adrenalin was applied and was temporarily successful in checking the bleeding. A quarter of an hour later, however, there was a recurrence and recourse was had to turpentine and ethyl-chloride freezing, but with only partial success. The stump was then stitched and invaginated with a purse-string suture, with the result that no further bleeding occurred till the following morning, when there was another recurrence. An attempt was now made to control the hæmorrhage by acupressure, crossed needles being inserted through the base of the stump and fresh blood being applied locally. At the same time, as the child was collapsed from loss of blood, 20 c.c. of normal horse serum were injected into the subcutaneous tissues of the back. These means succeeded in preventing further loss till the afternoon of the same day, when fresh oozing was noticed and continued in spite of treatment for about an hour. Salines and brandy were administered per rectum in the hope of reviving the child, and as a last resort 10 c.c. of fresh citrated blood were transfused into the superior longitudinal sinus. After this the infant rallied and hopes were entertained of its recovery. Twelve hours later, however, there was a sudden recrudescence, and death occurred before the hæmorrhage could be controlled. The children were lying in neighbouring cots.

* Read 8th March 1922.

Presumptive diagnosis in both cases.—Hæmophilia.

For the laboratory and post-mortem findings in the second case I am indebted to Dr F. J. Browne.

Coagulation time (Wright), in (1) fifteen minutes; (2) seven and a quarter minutes. The normal coagulation time in children is four to five minutes.

Post-mortem Report.—Small, somewhat premature female child, body much blanched. Region of umbilicus sutured and transfixed with crossed needles.

Brain.—No injury to tentorium; a fair amount of ante-mortem clot on upper surface of left tentorium cerebelli.

Liver.—Pale yellow in colour, otherwise appears normal.

Around umbilicus there is a good deal of blood extravasated into tissues of abdominal wall. No visible sign of sepsis in umbilical cord stump.

Cultures from liver, lung, spleen, heart cavity, and hypogastric artery gave pure growth of B. Coliform organism.

The mother's blood Wassermann reaction was negative.

Hæmorrhage from the cord due to faulty ligation, or to imperfect healing of the umbilical cicatrix as the result of sepsis is comparatively common and the pathology is obvious. As contrasted with these, true omphalorrhagia is at once more interesting, more obscure in its pathology, and more tragically dangerous. Many practitioners with wide obstetric experience have never met with a case, and all writers on the subject state that it is comparatively rare. A review of the literature shows what scanty attention it has received. So far as I am aware, the only case recorded and discussed by this Society was that of Keiller in 1880. Watts, a physician in Kent, first drew attention to the condition in 1752.

The hæmorrhage may occur at any time from the third to the fifteenth day, before, during, or after separation of the cord, and may escape in the form of a fine jet, or more frequently as a gradual oozing, which is often copious. It may cease with or without treatment, usually, however, only to recur later, death supervening more or less rapidly in the large majority of cases.

The pathology and etiology of true omphalorrhagia are imperfectly understood. Professor A. R. Simpson among others suggested that the administration to the mother during pregnancy of potassium chlorate or of alkalies, predisposed to umbilical hæmorrhage through their effect on the blood, but I can find little in the literature to support this view. Herrgott

has described a case associated with malformation of the left side of the heart, and in other instances the hæmorrhage has been ascribed to developmental abnormalities of the umbilical arteries, for example, their origin from the aorta. Such, however, while of pathological interest, are of little importance in the etiology.

In the majority of cases, from divers causes, congenital or acquired, the blood or blood vessels are profoundly altered, so that with the establishment of the new circulation at birth the normal physiological occlusion of the umbilical vessels fails to occur. This in turn appears to result from some systemic dyscrasia, preventing the formation of thrombi sufficiently firm to resist the pressure of blood within the hypogastric arteries. More often than not the hæmorrhages are multiple, and though that from the umbilicus is the most frequent, other sources may be found in the gastro-intestinal, respiratory, or genital tracts, showing the presence of some grave systemic disturbance. In one of the cases recorded to-night there had been a cerebellar hæmorrhage before death.

Among the various conditions to which this hæmorrhagic syndrome has been ascribed the most frequent are:— (1) Abnormalities of the liver or gall bladder, congenital or acquired; (2) Systemic infective processes; (3) Syphilis; (4) Hæmophilia.

(1) *Icterus* has long been recognised as a frequent concomitant of omphalorrhagia. The exact influence of bile or its elements on the blood does not concern us here, but the tendency of jaundiced patients to bleed, for example after operation, is well known. In a series of 178 cases Jenkins found that 77 had marked icteric symptoms. In 5 of these there was a congenital occlusion of the common bile duct. In 230 cases of omphalorrhagia Henning states he found jaundice in 89. Dr John Thomson in 1892 collected 49 cases of congenital obliteration of the bile ducts, in over 50 per cent. of which there were hæmorrhages from the skin, gastro-intestinal tract, and umbilical cord, the majority dying within a month of birth. Apart from the different series collected and analysed by these observers, many individual cases recorded in the literature have shown clinical or post-mortem evidence of abnormalities of the biliary apparatus. Pathological conditions have been so frequently found in liver or gall bladder as to justify adoption of the view that they have etiological importance.

(2) *Systemic Infection.*—The occurrence of cases in groups made it inevitable that a bacterial theory should be propounded. Writing on the pathogenesis of hæmorrhagic disease of the newly-born, Lequeux suggests that ill-health of the mother during pregnancy of the nature of Bright's disease, chronic alcoholism, and, above all, syphilis largely predisposes to it by lessening the resistance of the child to a systemic infection which may develop *in utero* or be acquired during or immediately after birth. He regards this as the starting-point in many cases of the so-called hæmorrhagic syndrome. Work along this line has been carried out principally by French observers, and numerous organisms, streptococci, staphylococci, the bacillus pyocyaneus and the pneumo bacillus, have been found in the blood and in the tissues of the affected children. No characteristic organism, however, has been isolated, and so few authentic cases have been recorded that it is difficult to know what value to assess to this theory ; I feel, however, that both the cases now recorded belong to this group.

(3) *Syphilis.*—From an analysis of cases recorded individually and collectively, there can be no doubt that in the production of the hæmorrhagic diathesis in infants, syphilis takes an important part. On this all writers are agreed. In a large number of the cases which I have been able to trace in the literature, there was either a definite history of parental syphilis or the child presented syphilitic stigmata. Out of 21 cases of neo-natal death from syphilis, Brown found hæmorrhagic lesions in 8, although in none was it umbilical in origin. Although in the different series of cases I have noted above under icterus, the proportion of syphilitics is unknown, syphilis is recognised as a common cause of icterus neonatorum, and I think we are safe in presuming that the incidence was high.

Apparently syphilis may act by itself in producing hæmorrhage through the profound alteration it induces in the blood or blood vessels, or it may be responsible for the hæmorrhagic tendency through its effect on the liver, or, as Finklestein and the French writers suggest, by creating a favourable soil for microbic infection.

(4) *Hæmophilia.*—It is common to ascribe to hæmophilia any unexpected or sudden hæmorrhage in children where the explanation is obscure. In discussing the etiology, however, I have purposely mentioned it last, because, as far as one can judge, the frequency of hæmophilia as the underlying patho-

logical condition in omphalorrhagia has been exaggerated. In support of this, Grandidier states that out of 576 cases of hæmophilia there was hæmorrhage from the umbilicus only in 12. He reported 7 cases of Jewish children having no trouble at the time of separation of the cord, but all of whom succumbed to preputial hæmorrhage at circumcision (presumably hæmophilics). He further argues that as the great majority of children suffering from omphalorrhagia die, there is no means of knowing whether later in life they were subject to hæmorrhage, but in those he knew of who had survived he had found no such tendency. It is true that in both cases recorded to-night idiopathic hæmophilia was diagnosed. The grounds for this diagnosis appear to me unconvincing, as not only was the child who died a female, but in neither case could a family hæmophilic taint be traced. One can also exclude both syphilis and disease of the liver or gall bladder. The post-mortem report makes it probable that the hæmorrhage was due to a general *bacillus coli* infection. And that this should be the diagnosis in the case of both infants is suggested by their occupying neighbouring cots and suffering at the same time.

The prognosis in true omphalorrhagia is grave in the extreme, the mortality in the recorded cases being over 84 per cent. The most unfavourable cases are those where, in addition to the umbilical hæmorrhage, jaundice and purpura hæmorrhagica are present, this being regarded by Morris as a precursor of certain death. Since the introduction of blood transfusion the mortality has fallen considerably.

Though of rare occurrence, omphalorrhagia is sufficiently often fatal to justify a note on treatment. Energetic treatment of syphilis where present in the pregnant mother or in the newly-born, and the prevention of the development of icterus and of sepsis, comprise the prophylaxis.

The actual treatment in the majority of cases should be both general and local. Apart from that form due to umbilical sepsis, which is dealt with along the usual surgical lines, the hæmorrhage is most efficiently controlled locally by a purse-string suture or by acupressure with crossed needles. Proprietary preparations, such as hæmoplastin or coagulin, are said to be of value, but are not always to hand. In all but slight cases, styptics, collodion, or cauterisation are quite unreliable, and their application only results in the loss of valuable time or in a recrudescence which may cost the child its life. Even with acupressure there may be

free oozing from the needle punctures. More important than local measures is the introduction into the external jugular vein or superior longitudinal (sagittal) sinus of 100 to 150 c.c. of citrated blood from the parent, the object being not only to replace that which has been lost, but also to introduce into the child's circulation the element needed to facilitate coagulation. This line of treatment should be adopted early, and not as a last resort. Transfusion without doubt is our sheet-anchor, and often the only means at our disposal by which the child may be rescued from certain death.

I have to thank Dr Lamond Lackie for permission to publish these cases.

Discussion.

Dr Ballantyne thought that many cases of omphalorrhagia were due to infection (septic or syphilitic), but a few were really caused by hæmophilia. He had met with a case in consultation some years ago in which the history pointed to syphilis. The umbilicus had been transfixed with needles and ligatured *en masse*, the sharp ends of the needles being snipped off. On the next day there was still some bleeding, when he had discovered a patent urachus, through which urine was escaping and helping to keep up the hæmorrhage. In the end, however, the bleeding stopped and the patient recovered.

Professor M'Kerron stated that he had seen only one case of serious umbilical hæmorrhage, and that was many years ago. The child died within four or five days in spite of treatment. Dr Miller had suggested hæmophilia as a possible cause in some cases, but hæmophilia rarely manifests itself in children till after the first year of life. It is possible, however, that infants in hæmophilic families may show a hæmorrhagic tendency. Dr M'Kerron then described a case of fatal vaginal hæmorrhage in the newborn which came under his observation. The child, which was slightly premature, had a discharge of blood from the vagina five days after birth. As these discharges have usually little significance, the child was not seen till twelve hours after, when it was found to be blanched and collapsed, having lost a large quantity of blood from the vagina. In recording this case, at the time the opinion was expressed that it was probably an instance of hæmophilia, as was suggested by the fact that a considerable quantity of blood had been lost from a slight scratch on the face. As regards icterus neonatorum, Dr M'Kerron doubted whether this was ever a factor in the hæmorrhage of the newborn.

Dr James Young asked Dr Miller if any histological examination of the organs had been made. It was an interesting point that the

liver was very pale and was certainly suggestive. Were there any changes in the kidneys? The child died so soon that one would not expect that there were any advanced changes.

Mr D. M. Greig said that he had seen three cases of uncontrollable hæmorrhage from the umbilicus in the newborn and all had ended fatally. These were children, who, born in the city, had been sent into the children's ward by the attendant on the same or the following day. Beyond dressing and ligature he had attempted nothing. Dr Miller had referred to jaundice as a possible cause. Mr Greig had had considerable experience of operating on jaundiced persons, though not the newly-born, and he thought the danger of hæmorrhage on account of jaundice was much exaggerated. He had never seen any more hæmorrhage in jaundiced than in unjaundiced patients, nor had hæmorrhage ever appeared to him to be less because of the previous administration of calcium chloride or other drug. Mr Greig noted that Dr Miller's fatal case of hæmorrhage occurred in a female child, and he pointed out that in his opinion there was no proof whatever that hæmophilia ever showed itself in females, and this was also the conclusion come to by Bulloch and Fildes in their classic monograph, *Treasury of Human Inheritance*, Parts V. and VI. London, 1911.

The President, on behalf of the Society, thanked Dr Miller for his paper, and remarked that the only two cases of omphalorrhagia that he had ever seen were those which Dr Miller had just recorded.

Dr Miller, in reply to Dr Young, said that no histological examination had been carried out.

EXHIBITION OF SPECIMENS.

MEETING—10th May 1922.

Professor R. G. M'Kerron said—The specimen I show this evening is one of **Chorion Epithelioma of the Uterus**. I shall leave the specimen to speak for itself, and limit myself merely to a record of the clinical history of the case. I do so because there are now so many excellent descriptions of chorion epithelioma both in recent text-books and in isolated papers that it would be quite superfluous to occupy your time with any observations on this comparatively rare though important disease. I would, however, call the attention of those who may not already have read it, to the admirable and exhaustive account of chorion epithelioma by Professor Teacher in the "New System of Gynæcology." Dr Teacher is recognised as the foremost authority on the pathology of the disease in this country and his article will remain, I am sure, for many years to come the last word on the subject.

Unfortunately, the specimen is so mounted that it does not show

the growth in the interior of the uterus. The cavity was filled with discoloured blood-clot, firmly adherent all round the uterus. The wall of the uterus is thinned out, the growth not only penetrating the wall here and there, but extending into the blood-clot practically all round. On the anterior surface, just below the right corner, there is a projecting nodular mass of growth. Above and behind this there is a necrotic area of uterine wall; another small nodular projection is seen in the neighbourhood of the left corner. Lower down on the anterior surface is a ragged necrotic area, where the growth has destroyed the peritoneal coat.

In the right broad ligament, just below the attachment of the Fallopian tube, there is a mass of growth about the size of a walnut, and in the ovary a small secondary nodule about the size of a bean.

I have here three slides, one showing a section through the uterine wall and growth, one a section through the mass on the broad ligament, and the third a section through the nodule in the ovary.

The clinical history of the case is as follows:—

The patient was 23 years of age; it was her first pregnancy. On 7th July of last year, after repeated hæmorrhages, she expelled a hydatidiform mole. As more or less bleeding persisted, she was seen in my absence by one of our junior surgeons who curetted the uterus. The scrapings, which contained no cysts, were not examined. She had irregular pyrexia up till the end of August, when she was admitted to a surgical ward in the Aberdeen Royal Infirmary, when I saw her in consultation She was then suffering from pain in the lower abdomen with pyrexia. A tumour was found in the lower abdomen reaching up to within about an inch of the umbilicus. On internal examination there were signs of pelvic inflammation. The possibility of chorion epithelioma was suggested, but in view of the possibility of a pelvic abscess, laparotomy was advised. Three days later an abscess burst spontaneously just above the symphysis and a large quantity of offensive pus was discharged. The swelling in the abdomen rapidly diminished; the woman's condition improved and she was discharged on the 23rd of September.

The bleeding soon recurred, and persisted more or less continuously up till the time that she came to the Gynæcological Out-Patient Department towards the end of February. She was then markedly anæmic. She stated that she had been losing blood almost continuously since September, and that recently she had been troubled with a blood-stained expectoration. The temperature was slightly elevated. The uterus was enlarged to about the size of a three and a half months' pregnancy, the fundus reaching 3 in. above the pubes. Chorion epithelioma was suspected. The cervix was dilated and the uterine cavity explored by the finger, when an irregular growth filling up the uterus, but chiefly on the anterior wall, could be felt. To confirm the

diagnosis, curettage was performed Microscopic examination showed chorion epithelioma. On the third day the temperature rose to 103, and the woman became seriously ill, too ill for hysterectomy. She became steadily worse and died on 10th March, a fortnight after the uterus was curetted.

Infection and rapid metastasis would seem from published records to be a not uncommon result of curettage in cases of chorion epithelioma.

May I be permitted to refer to and illustrate the uncertainty of the diagnosis of chorion epithelioma, even from microscopic examination of the tissue removed. Teacher draws attention to this difficulty, and points out that, owing to the degenerative changes which occur in the tumour in consequence of hæmorrhage, the material most likely to be scraped out is the old blood-clot and enclosed degenerated tumour tissue, and under the microscope this may not show the typical appearance of chorion epithelioma. Further, the danger of mistaking conditions which are probably normal or only slightly pathological for a malignant growth is great, and that is the point I wish to illustrate.

I was asked by her doctor to see a young married woman with irregular hæmorrhage. She had just stopped nursing her first child, which was ten months old. She had had one normal period, and six weeks after the bleeding began. The hæmorrhage was attributed to an early and incomplete abortion, and curettage advised. The scrapings were sent to the clinical pathologist at the Infirmary for examination, chiefly to ascertain if there were evidences of a recent pregnancy. He reported to me that in his opinion the condition was chorion epithelioma, and that with this opinion both Professor Shennan and Dr Cruickshank, the cancer research lecturer, agreed.

That, of course, was a serious situation for a young married woman, and before deciding on hysterectomy I put a series of questions to the pathologists. (1) Were they absolutely convinced that the condition was chorion epithelioma? Not one of them would say he was absolutely certain. (2) Might similar cellular elements not be found in a case of incomplete abortion? That was admitted, but they thought the growth and distribution of the syncytial cells in this case suggested malignancy. (3) Would it be safe to wait, curette again, and make certain? It was agreed that there would be no great danger in doing that.

Seeing that there was some room for doubt, it occurred to me that it might be well to send the slides to Dr Teacher for an opinion. That was done, Dr Teacher reporting that it was "almost certainly not chorion epithelioma."

The woman, I understand, is still (two years later) in excellent health. The case confirms Dr Teacher's statement, that though we can hardly overestimate the value of the histological test, "the rule that

diagnosis should not be allowed to rest on microscopic evidence alone applies more strongly perhaps to chorion epithelioma than to any other tumour, on account of the fact that the features of the tumour are also those of the chorionic epithelium, both anatomically and in respect of functional activity."

The President thanked Professor M'Kerron for coming from Aberdeen to show these specimens.

Dr Fordyce said that it so happened that within the last two or three months he had had one or two cases of this kind. Dr M'Kerron's case bears out the point that curettage of the uterus is not diagnostic, and may be negative. One of his cases was a young woman of 26, who had been delivered of a hydatid mole ten days before she was admitted to the Infirmary. She came in really on account of a high temperature, and she was profoundly septic. On exploring the uterus Dr Fordyce could find nothing, but in the right broad ligament he found a small mass and thought it was possibly some disease of the appendages. The woman was treated for a few days in the ward, but died. She had all the symptoms of acute septicæmia. The pelvic organs contained nothing but a black sloughing mass, and a very definite uterine tumour, which on microscopic examination, proved to be chorion epithelioma. Even as far up as the lungs there were growths. Dr Fordyce had never known of such a case as this. It seemed that the process had been going on during the time that the patient had the hydatid mole, so it must have been a malignant one. In the great majority of cases the chorion epithelioma comes on several months afterwards. This case died of septicæmia, but it must have come on not more than a fortnight after the expulsion of the hydatid mole. There was nothing in the uterus to account for the sepsis.

Mr D. M. Greig spoke of a case which he had some three years ago. It ended fatally, but he was much impressed by the great difficulty in diagnosis. Indeed the condition was only recognised as chorion epithelioma at the operation, though subsequently confirmed by pathological examination by Professor Sutherland and Dr Teacher (Glasgow). The patient was a healthy woman, 28 years of age. It was her first pregnancy and some months previously she had what was thought to have been an early miscarriage. She was attended by a well-known woman doctor in London, and made apparently an ordinary recovery though she did not feel particularly strong, and a little discharge occurred on occasions. This she considered was irregular menstruation. After some weeks' residence in the country she was admitted to a nursing home and curetted The scrapings were said to have been examined and to be "all right." She continued not very strong and somewhat bloodless and did not feel fit for the very active out-door life she had been accustomed to lead. In consultation with her own doctor, the woman doctor who had attended

her in her miscarriage and a near relative, who is also a medical graduate, she was seen by a well-known London gynæcologist and obstetrician, a man of great experience. Examination, consideration, and re-examination resulted in the definite pronouncement that the patient was suffering from an ordinary subinvolution of the uterus. The treatment ordered was carried out without much effect. The same consultant again examined her with the others and assured her that there was nothing much the matter, but that the uterus was a little larger than usual but would come all right presently. She was advised to visit her friends in Scotland, and to have a hypodermic injection of pituitrin twice weekly.

A day or two after her arrival in Scotland the woman doctor (the relative) who accompanied her administered the first dose of pituitrin. The patient nearly died. She was seized with severe abdominal pain, became collapsed, cold, pulseless, and semi-conscious. She did not vomit. A local doctor was called in and morphia administered and the symptoms gradually passed off. A few days afterwards the second injection was administered with a like result, and on the following day I saw her.

I found her well nourished but decidedly anæmic. There was slight vaginal discharge, the remains, she said of her period which was passing off. There was no general peritonitis and the abdomen was only generally tender "from the terrible time she had had on the previous day after the hypodermic." There was, however, a little resistance towards the pelvis, and more on the right side than on the left. In view of the distinguished authorities who had excluded disease of the reproductive organs, it seemed unlikely that the condition was tubal and the diagnosis was appendicitis adherent to the right ovary or tube. A few days later, therefore, I exposed the parts in the Trendelenberg position by a median suprapubic cœliotomy. The uterus was found large and in places its walls were bulged into translucent-like areas by tumour growth. The right tube and broad ligament was much infiltrated and the disease was extending along the vessels towards the flank. The veins were large, and in one which was removed the tumour was permeating the lumen. It seemed impossible that metastasis had not already taken place. She died of exhaustion on the fifth day.

It seemed almost inconceivable that distinguished, experienced gynæcologists should not have been able to recognise clinically a condition which must have been far advanced, at any rate at the time of their last examination, and so warn the patient and her friends of the danger.

Dr Haig Ferguson asked if in the course of curettage the woman bled profusely, because in eight cases which he had had, the great features was the very serious hæmorrhage which took place at the diagnostic curettage, so much so that the uterus had to be plugged.

Dr M'Kerron, in reply, stated that there had been pretty severe hæmorrhage during curettage, but what impressed him was the small amount of tissue which came away.

Dr Farquhar Murray showed specimens of **Secondary Abdominal Pregnancy following Incomplete Tubal Abortion.**

Mrs W., æt. 39. History of seven months' amenorrhœa. During that time she had three attacks of pain in the left lower abdomen, during which she felt sick and occasionally vomited. The attacks occurred as follows:—(1) Seven weeks after her last period; lasted three days. (2) Two months later, similar in duration. (3) Fourteen days before admission, very severe and lasted seven days. No vaginal bleeding at any time during the seven months.

Examination—Breasts actively secreting. Abdomen: there was a pelvic tumour rising up to the level of twenty-eight weeks' gestation. This was divided by a groove into two parts. The lower, which suggested a full bladder, caused the greater prominence. No souffle, fœtal heart or fœtal parts could be detected. Pelvic examination: the uterus, enlarged to between three and four months' gestation and of soft consistence, was pushed forwards and upwards by a large, firm, and nodular mass in the Pouch of Douglas. This mass could be moved with the main abdominal enlargement, which was of softer consistence. The cervix could be felt high up and behind the symphysis.

A provisional diagnosis was made of secondary abdominal pregnancy and the abdomen opened up by median incision.

The uterus, large and soft, lay close against the abdominal wall. A large dome-shaped mass covered with fibrin, and with many vascular omental adhesions, lay behind and above and appeared to be the top of a large hæmatocele. On separating the uterus from the mass, a fœtus (six months' development) was found lying in the transverse position with its back presenting and tightly packed in the pelvic brim. The irregular nodules felt in the Pouch of Douglas before operation were its limbs. It was enveloped in amnion, which contained very little fluid and which was ruptured before extraction. The fœtus lived and breathed for three-quarters of an hour. The cord and amniotic membrane entered a dilated tubal ostium which was lying in the right side of the pelvis and which admitted the tips of two fingers. There was no free blood. After separating and tying the omental adhesions and breaking down some of a fibrinous nature, the remaining mass, which consisted of a very distended tube and which obviously contained placental tissue, was lifted up and its uterine and pelvic attachments divided between ligatures. The bulk of the vessels were found in the infundibulo-pelvic ligament. The amniotic sac was readily separated from the Pouch of Douglas.

The patient made an uninterrupted recovery.

Comment—Tubal abortion is comparatively common, a blood-mole being extruded. Incomplete tubal abortion where the embryo in its amniotic sac is expelled through the ostium while its placental attachment remains in the lumen of the tube, is illustrated in various text-books. Survival of such an embryo is extremely rare. In the present case the expulsion must have occurred at an early date, as the fœtus showed signs of prolonged pressure, its hands and feet being much distorted. The tube also was completely filled with placental tissue.

Specimen II.—Pregnancy in a rudimentary uterine horn. Case showed two months' gestation in a horn which was attached to the main body by a narrow pedicle. Section of the pedicle showed no evidence of any communication.

Dr Murray asked whether the absence of an obvious communication indicated merely obliteration of the canal or was it proof of transperitoneal wandering of the spermatozoon?

Dr Ballantyne, with regard to the life of the fœtus in ectopic pregnancies, called to mind that a good many years ago Professor F. von Winckel had published some dozen cases in which extra-uterine fœtuses had been removed and had survived birth; they, however, had shown malformations of the head in most cases. With regard to the matter of the possible migration of spermatozoa, Dr Ballantyne thought that Dr Murray had given too little credit to the spermatozoon for power of locomotion; if the sluggish ovum could pass from one ovary across the pelvis to the opposite tube, why might not the active spermatozoon do the same?

Dr Young recalled a specimen which had been shown by Dr Haultain. It was something similar to this one, the child lying in the abdomen and it had gone on growing, but in that case the extrusion must have been through the wall of the tube. It was even more remarkable in some ways, because the child was quite free in the peritoneal cavity. The whole thing was completely healed and cleaned and the conditions suggested that the rupture had occurred fairly early. No case had been shown recently.

Dr Keppie Paterson asked if anything came from the uterus. *Dr Murray* replied that there was no discharge of blood or decidua prior to admission nor during the three weeks the patient was in hospital.

PRIVATE BUSINESS.

The following were elected Ordinary Fellows of the Society:—T. H. W. Alexander, M.B., F.R.C.S.E.; Thomas Sprunt, M.B., Ch.B.; Nathaniel Hirschman, M.B., Ch.B.; R. Prosper Liston, M.B., Ch.B.

FURTHER STUDY OF AN ORGANISM OBTAINED FROM CANCEROUS GROWTHS.*

By JAMES YOUNG, D.S.O., M.D., F.R.C.S.

In previous papers[1] I have described two organisms which I have obtained from malignant growths in the human subject and in the mouse. These organisms are very similar and perhaps identical.

In one phase, which is Gram-negative, they grow on an ordinary agar slope with free access to oxygen as small cocci, as short bacilli, or as long filaments. The last form may on occasion reach a very considerable microscopic length. In the same culture all three forms may be found growing together, and the varying appearances strongly suggest that we are dealing with differing degrees of fragmentation of an organism which tends to grow under favourable conditions in a filamentous fashion.

An interpretation of this sort, I believe, may partly account for the different organisms that have been isolated from malignant growths by different reputed observers. For, in a fluid medium especially, the organism may at one time appear entirely as minute cocci, at another time as short bacillary forms, whilst at still another time the filamentous shapes may be present. The germ may, however, appear as Gram-positive forms, and in this phase it grows on ordinary media as a staphylococcus.

In the present paper I wish to record some observations which throw further light on the parasitic phase of the organism. At this Society, in June 1921, I expressed the opinion that the organism lived in the tumour tissue, (1) as a minute phase in the cancer cell, (2) as a larger, yeast-like phase, which was present in the cell and in the intercellular tissue. I suggested and gave reasons for my belief that, when the tumour tissue was incubated in a suitable medium, the organism was liberated from either or both of these sources. You may remember that I showed round or oval bodies like disintegrating nuclei containing and apparently liberating the organism into the surrounding medium.

* Read 14th June 1922. The investigation was carried out on behalf of the Medical Research Council. It was conducted at the Royal College of Physicians' Laboratory, Edinburgh.

For the past six months I have been studying the tissues of the infected animal in an effort to trace the changes which the organism undergoes in its natural parasitic environment. From an early stage in the research I suspected that in the cancerous tissues I could recognise a comparatively large form which, in the fresh tissue fixed in the ordinary way, was only distinguishable with difficulty from cell-nuclei and disintegrating cellular material, but which could be observed to break up into the coccal or bacillary form when the tissue was incubated. Repeated observation satisfied me of the existence of this phase, but only on rare occasions have I found it possible to reproduce it in cultures made for the purpose of studying the life cycle, and then only imperfectly. It seemed that it only matured in its fully developed form in the animal tissue. If this were so a study of the infected tissues would alone solve this question and incidentally it was felt such a study would provide a test of the accuracy of the preceding morphological observations.

As I have shown elsewhere, a diffuse lymphomatous or lympho-sarcomatous lesion is produced in animals infected with the organism obtained from mouse carcinoma. In smears made from the tissue (*e.g.*, liver or spleen) in a chronic case the organism cannot usually be recognised in the form in which it was introduced, except with the greatest difficulty and often only after a tedious search; the larger forms are, however, often found easily. In the same tissues of an animal that is killed soon after the infection, and that is suffering from lesions, the organism in all stages can be recognised usually with comparative ease. For a successful study the examination must be made by smears dried on the slide. Fixation in a medium that coagulates the protoplasm of the tissue obscures the appearances.

When stained with a differential stain, *e.g.* Leishman, the film presents appearances seen in Figs. 3, 4, 5, and 6. The organism can often be studied in little colonies that exhibit all stages, bacillary, coccoid, and yeast-like. The coccoid forms are round or oval and characteristically take up the acid stain. Lying within them, one or more darkly staining granules or irregular masses may be visible under high magnification, and the appearances suggest that during the evolution of the coccus there is occurring a sort of chromidial redistribution. The details of the process, however, are too minute for accurate description. I have figured these appearances as far as they

can be picked out by the camera, in a preceding paper. The yeast-like bodies appear as elongate, oval, or rounded forms, the protoplasm of which stains with a varying intensity of blue, and in them one or more granules of a purple colour are sometimes present. The blue bodies vary in size from comparatively small forms up to those that are as large as red blood corpuscles. They are found apparently lying in the protoplasm of the cell-bodies and in the intercellular spaces, but from the examination of a smear it is impossible to draw rigid conclusions as to the actual relation of the parasite to the cell in the living tissue. The frequency with which it is found in all phases lying in the protoplasm of the cells, however, suggests very strongly that an actual infection of the cells themselves occurs.

I believe that I have been able to recognise these blue bodies in the chronic lesions of experimentally infected mice, in smears made from human and mouse cancer (in which they are often difficult to find, Figs. 12-16), and in the blood of a case of human leukæmia. In old-standing lesions the bodies consist, for the most part, of round, oval, or elongated forms in which there is little appearance of structure, though occasionally a vacuolated appearance is vaguely recognisable. Occasionally one or more eosinophil granules may be detected, though these are less distinctive than in the case of the similar bodies present in early lesions. The general protoplasm characteristically stains blue, the intensity with which the stain is absorbed varying greatly. In the intercellular spaces commonly and in the cell-bodies more rarely the blastomycete form may stain very deeply, and then a thin halo is frequently found to encircle it like a non-staining capsule (Fig. 16).

In view of these observations the question arises as to whether the larger phase is not in reality the form in which the organism lives parasitically in the chronic lesions. This view would necessarily imply the possession of a faculty of proliferation in the tissues of the infected host.

In the whole course of an extensive cultivation of cancerous and lymphomatous lesions in artificial media I have not obtained indubitable evidence that the large phase can proliferate *in vitro*. Rather, as we have seen, this phase under these conditions rapidly germinates into the coccoid, bacillary or filamentous forms. Whilst this is so, on two occasions I have found large forms of a similar nature in considerable numbers in my test tubes. In both cases the cultures were made from

human cancer. In the first the forms appeared early and in the second they were found after the medium had been lying for some months at room temperature. In both instances the blue nucleus-like bodies were growing in the presence of the bacillary and filamentous forms. In the first case no attempt was made at subculture. In the second case the larger forms grew readily at room temperature as a pink-red growth when subcultured on a horse-serum-agar slope. No growth occurred at 37°. No effort was made to maintain the growth by subculture and it had died out before the possibilities that its further study might have presented were recognised. Fig. 20, which is a photograph taken from a film made from the fluid medium in which it was originally found, suggests a development of filaments from one of the round bodies.

Germination of the Yeast-like Form.—As we have seen, the smaller phase of the organism may appear as minute granules, as cocci, as bacilli, or as filamentous forms depending partly upon the medium used and partly upon factors so far undetermined. It is not therefore surprising that germination of the yeast-like phase will present appearances varying greatly in different cases.

The usual picture consists of a liberation of minute cocci or short rods, the filamentous arrangement being comparatively rare. During the germination process the blue body becomes pale, minute granules develop, and this is followed by the appearance of the emerging forms (Figs. 11 and 19). Figs. 1, 2, 17, and 18 exhibit the appearances seen with the filamentous liberation. The film from which Fig. 1 was derived was from a non-ulcerated mass which recurred in the supraclavicular region after an operation for cancer of the breast. The tissue was left at room temperature for sixteen hours and it exhibits the process in almost diagrammatic fashion. Such a clear picture is never obtained when the tissue is incubated in a fluid medium, for in this the fine detail is obscured. The bodies which exhibit these striking histological appearances have the character of pale round or oval globules which often seem to abut on a nucleus. Occasionally they can be picked out where they lie in a mass of tumour cells. In this phase the filaments are often so thin as to be scarcely visible. They sometimes present an appearance suggesting branching, and when they lie close together they may form a fine meshwork though the detail is too minute to allow of any certainty in this matter. When

germination occurs in the filamentous manner the picture may closely resemble that presented by a minute streptothrix.

On some occasions the germinating body is entangled in and surrounded by a structureless débris, which stains deeply with the ordinary stains (Fig. 19). This appearance, which is common in incubated cancerous tissue, was a source of great perplexity to me for some time, for it was difficult to explain why in some cases the germinating forms were clean, whereas in other cases they were so enveloped in débris as often to be completely obscured. As the result of repeated observation, I now believe that the latter appearance corresponds to the germination of the capsulated form and that the débris consists of the split and separating capsule.

In previous papers I stated that I believed I had been able to observe the minute phases emerging from the nuclei of the incubated tumour tissue, and, for this reason, I suggested that in malignant disease we were dealing with a nuclear infection. It so happens that in many cases the yeast-like phase of the organism during its germination presents a picture resembling a cell-nucleus from which the minuter forms are emerging, and, on this account, I have been led to modify my former interpretation of the process. My recent investigations have satisfied me that what I have previously described and figured as nuclei liberating the organism were probably in most instances, if not in all, germinating blastomycete forms.

On a previous page I have said that the resting blastomycete body shows little or no evidence of internal structure. During the early stages of germination, however, before the coccoid and bacillary phases emerge, one can sometimes see it resolving into a number of rounded pale bodies suggesting that the structureless mass consists in reality of a spore containing a considerable number of minute endospores.

The discovery of a blastomycete form in the cycle of the organism revives the interest which the researches of Russell,[2] Sanfelice,[3] and others have always had for those convinced of the parasitic origin of malignant disease.

The uncontrolled impetus to proliferate which distinguishes a malignant tumour carries with it as an almost necessary implication a continued proliferation in the tissues of the infecting organism. The fact that the cells separated from the parent growth in metastasis carry with them the same riotous want of control suggests strongly that there is an intimate

union of tissue and germ, a union that partakes of the characters of a symbiosis, in which the organism lives within the cell in a phase, which allows of its ready transmission to the two daughter cells of a division.

In previous papers I suggested that this might be explained by supposing that the organism lived in a minute phase in the nucleus, and I gave reasons which seemed to place this supposition on fairly secure grounds. My more recent researches have, however, as we have seen, necessitated a new orientation of outlook, for whilst I have discovered no facts which necessarily exclude the nuclear possibility, the data on which this theory was advanced have had to be discarded.

In the fresh human cancer cell I have never satisfied myself that I could recognise anything but the larger phases of the organism. On several occasions, however, in tissue incubated for a short time, I have found the cell-body charged with the minute coccal and bacillary types. Figs. 13, 14, and 15 show cells as they appeared in a dried film made from a cancer of the breast, which had been kept at room temperature for twenty-four hours. The appearances suggest a heavy infection of the cell-bodies with a minute form which is enlarging into comparatively large cocci.

In the fresh cancer cell of the mouse I have on repeated occasions found what looked like groups of the organism in the minute granular form. The same appearance I have almost constantly found in the tissues of mice recently infected with the organism.

If these observations are confirmed the uncontrolled proliferation of the malignant process will have to be correlated with an infection of the cells with the organism in a phase so minute that, at any rate in the case of the fresh human lesion, it is impossible to recognise with the microscope. Even though this belief is established it will still leave open the question as to whether a proliferation of the organism in its larger phases does or can occur in the tissues. So far the findings tend to the view that the larger phase corresponds to the spore.

In order that the full meaning of the investigations recorded in the preceding pages be recognised it is necessary to recapitulate certain aspects of the work. As I have shown, from an early stage in the research it seemed that from the incubated tissue the organism was liberated in its smaller phases, in whole or in part, from comparatively large forms. This being so, it

was evident that the goal of any morphological research must be the reproduction from the minute phase of these larger bodies and the study of the cycle of changes underlying this phenomenon. This, I believe, I have been able to trace in its general details.

It may be urged that a purely morphological study of this kind does not adequately exclude the risk that some of the forms so dovetailed into the cycle may be due to contamination. This possible source of error has been constantly before me, and every effort has been made to avoid it by repeated observation of control healthy and infected tissues. In addition, there are several considerations of a positive character that have satisfied me that the sequence as described is in accord with reality. In the first place, commencing from one phase, as shown elsewhere, I have reproduced, with varying degrees of success, in *in vitro* studies of the life-cycle, all the forms seen in the tissues of infected mice. In the second place, in every case (fifteen in number) in which the tissues were examined for this purpose, the forms found corresponded accurately to the expected finding. In early lesions all gradations from the small phase up to the large phase were found. In the third place, the disposition of the organism in the tissues in the form of small isolated colonies, in many of which the whole gamut of change is represented, is so striking and suggestive as of itself to carry conviction. The fourth argument, which by itself might be considered to be specious, but which taken in conjunction with the other data has a considerable supporting value, is that the appearances as found were anticipated by the whole course of the preceding research.

Classification of the Organism.—The mouse organism used for the primary injections was derived from mouse cancer. In its infective phase it presents the biological characters of a *bacillus coli*. The organisms obtained from human cancer and leukæmia, so far as their examination has been carried out, gave similar results. The injection of the mouse strain produced typically a chronic and progressive lesion, which I have elsewhere described as diffuse lymphoma and lymphosarcoma. The extensive character of the experiments, the large incidence of positive results, and the almost completely negative character of the controls seemed to justify to the full the conclusion that the lesions were dependent directly upon the injections.

The biological study of the organisms recovered from

injected mice has been carried out in only a comparatively small number of cases; they comprise the most recent positive animals. The reason for this is that during the earlier and greater part of my investigations I was unable to obtain the co-operation of a skilled bacteriologist. Despite this I see no reason to doubt that the findings obtained in the series of animals actually investigated applies generally over the entire extent of the experiment.

For the following data I am indebted to Dr H. D. Wright, bacteriologist to the Royal College of Physicians' Laboratory, Edinburgh. The organisms obtained from the lesions of twenty-three mice which I have elsewhere classed as positive were submitted for examination.

In seventeen the mice were injected with the primary cultures obtained from mouse cancer, consisting of the *bacillus coli* form alone or in conjunction with the staphylococcal phase. These animals died after intervals varying from eight days to six months. The organisms obtained from them were identified as follows:

Salmonella group	13
Bacillus proteus	3
Bacillus coli	1

The remaining six consisted of animals injected with the organism of the Salmonella group obtained from the positive animals in the preceding class. They died after intervals varying from fourteen hours to sixteen days, and from all of the six mice the organism recovered was similar in its sugar reactions to that injected.

It will be observed that from the great majority of the animals infected with the *bacillus coli* type an organism of the Salmonella group was obtained. I admit that this finding introduces an element of fundamental discrepancy from the bacteriological standpoint.

Starting from the premises that the lymphomatous lesions in my experiments were induced by the introduction of the organism of the *bacillus coli* type, the subsequent course of the research is amenable to one or other of three possible interpretations.

(1) The *bacillus coli* was not the direct causal agent, but it acted indirectly by stirring up an organism of the Salmonella group present in some or all of the injected animals. The *bacillus coli* then disappeared, or, if it persisted in the tissues, it was swamped in

the cultures made from the tissues after the death of the animal.

(2) The *bacillus coli* induced the lesions in which the Salmonella organism developed as a secondary infection.

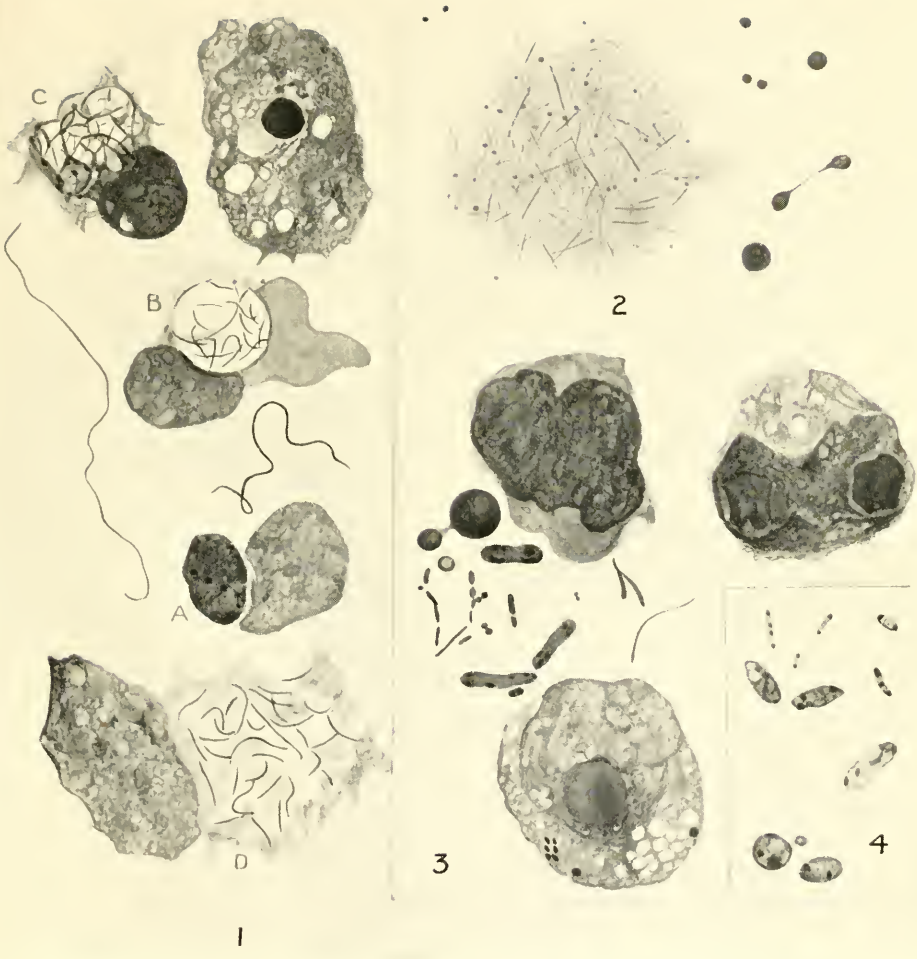
(3) The *bacillus coli* induced the lesions and in the process underwent an alteration in its sugar reactions, reappearing as an organism of the Salmonella class.

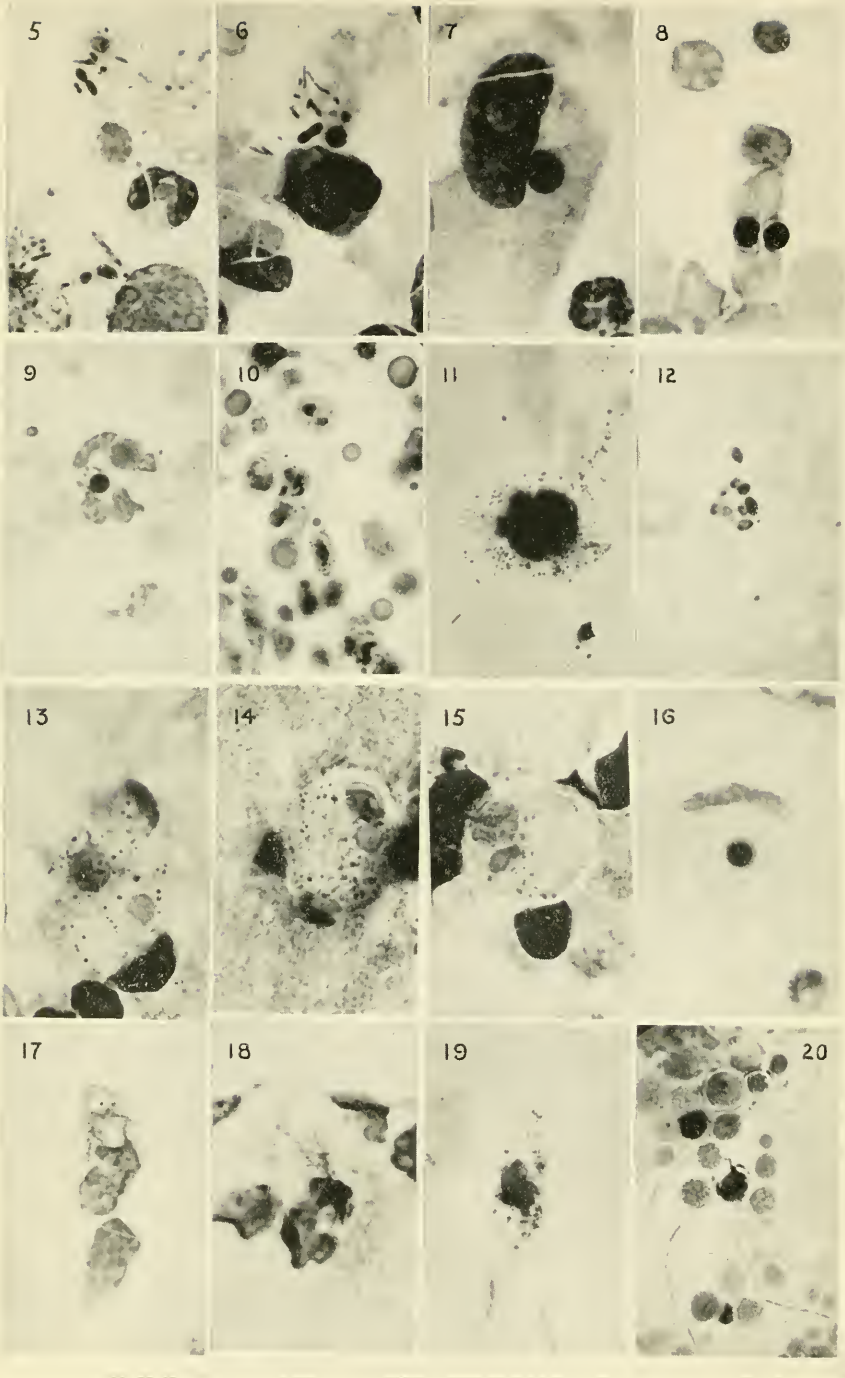
On the purely bacteriological aspect I must refrain in the meantime from offering any judgment. It is evident that before any effort to discriminate between the above three possibilities can be attempted further investigation is necessary.

Pending this investigation, however, I see no adequate reason to doubt the general validity of the research, especially as I believe that the preceding morphological studies rest on a foundation that is unassailable. Even in regard to the secondary experiments several considerations of a suggestive character emerge. In the first place a study of the tissues of the animals infected with the Salmonella group has revealed the presence of blastomycete forms similar to those found in the primary experiments as well as in cancerous tissue. In the second place the lesion produced by the non-lactose fermenter is always more fulminant and acutely fatal than that induced by the lactose fermenter. This difference would seem to denote a difference in virulence between the two strains. Along with this suggestive distinction, however, there is a fundamental resemblance in the histology of the two sets of lesion. In both instances it is dominatingly proliferative and malignant in its characters. In the acute as well as in the chronic lesion the histological picture is more that of a neoplasm than of an inflammation.

Conclusions.—(1) The investigations recorded in this and previous papers indicate that carcinoma, lymphosarcoma, and the closely allied leukæmic phenomena are all related to one another on etiological grounds. They are due to infection of cells by an organism (or closely related organisms) which in one phase, probably the infective phase, of its existence belongs to the coli-typhoid group.

(2) A study of its cycle indicates that this organism falls within the class of the higher bacteria or fungi. During its parasitic life it lives in symbiosis with the infected tissues. The exact form assumed by its "vegetative" phase in the tissues is still uncertain. There is some reason for believing that this


C
B
A
D
1
2
3
4


5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20

stage consists of a form contained in the cell and which is so minute that ordinarily it is not revealed by the microscope. At the same time the investigations have revealed in the tissues a larger phase which in its mature state presents the characters of a blastomycete. This stage may possess a capsule.

LITERATURE.—[1] Young, James, (1) *Trans. Edin. Obst. Soc.*, 8th June 1921 (*Edin. Med. Journ.*, 1921, New Series, vol. xxvii., p. 212); (2) *Journ. Path. and Bact.*, 1922, vol. xxv., pp. 151-2; (3) *Edin. Med. Journ.*, 1922, New Series, vol. xxviii., p. 233. [2] Russell, William, (1) *Brit. Med. Journ.*, 13th December 1890; (2) *Lancet*, 29th April 1899. [3] Sanfelice, *Zeitschrift f. Hygiene*, Band xxi., 1895, S. 32 and 394; Band xxii., 1896.

DESCRIPTION OF FIGURES.

ALL × 1000 unless otherwise noted.

1. Filamentous germination of the blastomycete form (A, B, C, and D). From dried smear of human cancer of the breast. Stained with Leishman. × 1400.
2. Filamentous germination. From film of human cancer of breast incubated sixteen hours in acid fluid medium. Stained with Leishman. × 1400.
3. and 4. Stages in cycle of mouse organism as studied in early mouse lesion and in liver. Composite drawing from dried smear. Stained with Leishman. × 1400.
5. and 6. Stages in cycle of mouse organism as studied in early liver lesion. Leishman.
7. and 8. Yeast-like phase in mouse liver. Leishman.
9. Small colony showing large and small phases in cell of mouse spleen. Leishman.
10. Yeast-like phase in skin lesion. Leishman.
11. Clump of yeast phase germinating into minute coccal and bacillary forms. Mouse cancer incubated four days in acid fluid medium. Leishman.
12. Large coccal form in smear of fresh human cancer of breast, showing intra-corpuscular granules. Leishman.
13, 14, 15. Cells in smears made from human breast cancer left twenty-four hours at room temperature. Each cell contains yeast-like form and large number of coccoid bodies of differing size. Leishman.
16. Capsulated yeast-like form in human breast cancer. Dried smear. Leishman.
17. Two pale globules in upper part of field showing early stage of germination. Human cancer of breast—dried smear. Leishman.
18. Tuft of minute threads in middle of field—stage of germination succeeding that shown in Fig. 17. Human cancer of breast—dried smear. Leishman.
19. Germination of capsulated form. Human cancer of breast—dried smear. Leishman.
20. Yeast-like forms in old culture tube in which human breast cancer had been incubated. One rounded body seems to be germinating into filaments. Leishman.

DISCUSSION.

Professor Russell said he was sorry circumstances had prevented him hearing the earlier communications that Dr Young had made at that Society and elsewhere on this subject—one in which he (Dr Russell) had long been interested. Before coming to the meeting he had looked up to see how long it was since he had communicated to the Medico-Chirurgical Society a paper on the supposed organism of cancer. It was thirty-two years ago. It was the first paper published on that subject and it sent a ball rolling which had continued to roll. He thought the parasite was a blastomycete, then it was thought to be

a protozoon. This was followed by a strong revulsion against the doctrine that malignant disease was due to the presence of parasites in the growth. Malignant tumour growth was looked upon as a reversion to an earlier type on the part of the cell. Or it was looked upon in another way — using modern phraseology — as a sort of cellular Bolshevism in the tissues leading to local cell multiplication, readily transported and infecting other localities, while their sole function was universal destruction: very much the Bolshevist attitude in the social organism. That view was still prevalent. Sanfelice, of Cagliari University, in 1906 thought that he had proved that the organism in cancer was a blastomycete but that also seemed to come to nothing. Then a great deal of work had been done in connection with rats and mice, and this had brought out some interesting facts bearing on the parasitic origin of malignant disease. Dr Russell had been a pathologist in his early days and had never wavered in his belief that cancer was due to a parasite. From the conditions seen and followed in the advance of malignant disease he could not get rid of the assumption that the disease was parasitic in origin. In Edinburgh there had been a certain amount of investigation carried on, and he had watched Dr Ford Robertson's work with interest, but that also had been on the whole disappointing. Now Dr Young had taken this matter up and he had been deeply interested in the papers which Dr Young had published giving an account of his observations and investigations. Dr Russell referred to the difficulties with regard to cultivation, but hoped that Dr Young would carry his research to a successful conclusion. Dr Russell advised him not to be too strongly swayed by the official bacteriologist. Dr Young should make his own observations and draw his own inferences, and use the technical bacteriologist only in so far as he could with advantage, for there was still more in this lower realm of life than the bacteriologist had discovered. With all due deference to bacteriological experts, Dr Russell did not think they had done much yet to solve the conditions affecting the life and transformation of these lower organisms; and he hoped that Dr Young might discover some entirely new facts in connection with the evolution and transformation of some of these lower organisms, and that he might find that the organism that produced a condition indistinguishable from sarcoma may, when acclimatised by certain conditions, be the organism which produces the extraordinary reproductive and destructive activity of the epithelial cell. The Professor expressed his firm conviction that only the presence of some living force could account for the stimulus of reproduction and purposeless reproduction which is shown in the migrated or transported cancer cell, and he fervently hoped that Dr Young might find out what that force was.

The President congratulated Dr Young on his work in the study of cancer and wished him every success in his research.

RECORD OF ECLAMPSIA IN THE ROYAL MATERNITY HOSPITAL, EDINBURGH, DURING TEN YEARS, 1912-1921.*

By H. S. DAVIDSON and DOUGLAS MILLER.

AT the request of the Council of the Edinburgh Obstetric Society we undertook to analyse the cases of eclampsia occurring in the Maternity Hospital during the years 1912-21, and the result of that analysis is shown on the accompanying table, but various short explanations must be given in regard to figures.

Analysis of 148 cases of eclampsia, with 64 extra cases included under headings A, B, and Infants :—

		Cases.
A.	Periodic Incidence :—	
	Six months—April to September	110
	Highest month—April	30
	Six months—October to March	102
	Lowest month—March	8
	Yearly Incidence :—	
	Highest year—1912	31
	Lowest year—1917	12
		Per cent.
B.	Proportion of Primigravidæ (0-para)	75
	Proportion of Twin Pregnancies	3·3
C.	No symptoms preceding Fits	6

			Died.	Recovered.
D.	Total number of Fits (average)		10	6·1
	Distribution of Fits—		Per cent.	Per cent.
	a = before labour	37	a 5 (13·5)	a 32 (86·5)
	b = during labour	33	b 11 (33·3)	b 22 (66·6)
	c = after labour	29	c 6 (20)	c 23 (80)
		6	a+b+c 3	a+b+c 3
		2	a+c 0	a+c 2
		8	b+c 1	b+c 7
		33	a+b 11	a+b 22
		148	37	111
			Per cent.	Per cent.
	Onset of Fits		a = 52	a = 54
			b = 32	b = 26
			c = 16	c = 20

* Read 14th June 1922.

Number of Fits before treatment (average). Cannot be ascertained.

		Died.	Per cent.	Recovered.	Per cent.	
Degrees of Coma (unnoted 44 cases) :—						
Deep coma	= ++ [24]	(47)	80	(53)	36·5	[27]
Coma	= + [6]	(14·3)	20	(85·7)	48·6	[36]
Drowsy, restless, etc.	= o [0]	(0)	0	(100)	14·8	[11]
Amount of Albumen (unnoted 29 cases) :—						
o = absent	[0]		0		0	
− = a trace	[0]		0	(100)	4·4	[4]
+ = large amount	[8]	(17·7)	28·6	(82·3)	40·6	[37]
++ = solid	[20]	(28·5)	71·4	(71·5)	55	[50]
Blood Pressure (unnoted 34 cases) :—						
114 cases only available: − = below 140	[4]	(25)	16	(75)	14	[12]
+ = 140-200	[15]	(18·5)	60	(81·5)	74	[66]
++ = over 200	[6]	(35·3)	24	(64·7)	12	[11]
Pulse (unnoted 72 cases) :—						
o = below 90	[1]	(10)	5·2	(90)	16	[9]
+ = 90-120	[12]	(26)	63	(74)	59	[34]
++ = over 120	[6]	(30)	31·6	(70)	24·5	[14]
Temperature (maximum) (unnoted 79 cases) :—						
o = below 100°	[7]	(16)	43·8	(84)	66	[35]
= 100° to 103°	[7]	(28)	43·8	(72)	34	[18]
= over 103°	[2]	(100)	12·5		0	[0]

E. Treatment :—

	Recovered.	Died.	Total.
Method of delivery		4 undelivered	
Post-partum cases	23	(20 per cent.) 6	29
Natural delivery	32	(25·5 ,,) 11	43
Operative delivery	56	(22 ,,) 16	72
C. S.	1	1	2
Vaginal C. S.	2	4	6
Forceps only	39	5	44
Dilatation and Forceps	3	2	5
Version	1	1	2
Induction	7	0	7
Craniotomy	3	3	6
			72

INFANTS (unnoted 8 cases) :—

(*a*) Premature = under 36 weeks.

Still-born.	Died.	Survived.	Twins Dead-born.	Total.
32	1	8	4	45

(*b*) Term—Still-born	66 + twins 5	71
Born alive . . .	86 + twins 5	91
Survived . . .	80 + twins 4	84
Died undelivered		4

Term—Total born alive	91
Infantile death-rate . . .	7·7 per cent.
Fœtal mortality	43·8 „

Like other schools we suffered during the years of war from a lack of graduate residents, so that it was impossible to obtain full notes on many cases out of the total of 212 which actually occurred. Nothing striking is to be elicited from the periodic incidence, but what is notable is the diminution in numbers during the war years 1916-19 when there were 17, 12, 15, and 15 cases respectively. I believe that Sir Halliday Croom was interested in the possible effects of war as an exciting cause in eclampsia, and analysed the cases in the Hospital during the South African War with the idea that more cases occurred as a result of the mental instability of the mother as a consequence of the danger to the husband's life occasioned by war; but this would seem to be contradicted by the statistics of the war years we have just passed through.

Whilst not wishing to be in any way dogmatic on the subject, we would suggest that the diminution in numbers of eclampsia was due largely if not entirely to the diminished amount of meat and such proteid material the whole nation suffered from in 1917 and 1918. As we expected, the proportion of primigravidæ is 75 per cent. and pretty well tallies with the statistics all over the world. The proportion of twin pregnancies amongst this was 3·3, but that seems to us a somewhat fallacious statement, as one requires the total number of twin pregnancies occurring and to take that percentage as the basis as to whether twins have the bearing on eclampsia which they are alleged to have.

Out of 115 twin pregnancies occurring in the Hospital during the ten years 1912-21, eight women (or 7 per cent.) developed eclampsia as contrasted with the incidence of eclampsia in single pregnancies given by Williams as 0·2 per cent. These figures seem to bear out the view frequently expressed, that a relationship exists between eclampsia and multiple pregnancy.

As regards no symptoms preceding fits this is exceptionally difficult to find out, and we have only taken 6 cases where

there is a definite statement in the notes that there were no symptoms.

As regards the total number of fits; the average number of fits amongst those who died was 10, whilst amongst those who recovered it was 6, but that seems to us to convey little information, and we did a further analysis which showed that in those patients who had less than 5 fits 86 per cent. recovered and 14 per cent. died; between 5 and 12 fits 78 per cent. recovered and 22 per cent. died; whereas where there were over 12 fits 50 per cent. recovered and 50 per cent. died, giving us very much the result that we expected that a large number of fits is a grave factor in the prognosis.

As regards the distribution of fits, we were surprised to find a large number of cases which developed eclampsia purely after labour. That there should be 29 out of 148 seems a large number, and of that number 6 died, whereas of the cases occurring during labour one-third died. Of those cases occurring only before labour 5 died out of 37. Whether this is due to earlier treatment in the cases occurring before labour, or, that "the before-labour class" includes many milder cases, is difficult accurately to make out.

As was to be expected, of those who had fits before, during, and after labour 50 per cent. died, but this is a small class numbering only 6 in all, and, as one would expect, the most severe cases. Of those having fits before and during labour, of whom there were 33, exactly one-third died, so that out of the distribution of fits it is not easy to arrive at any definite prognosis, except that probably taking cases of more or less equal severity, the post-partum variety is more likely to recover than the others.

Under the heading "Onset of Fits" we have the percentage amongst the deaths of the time of onset of fits. We cannot see that it is going to give us any valuable information. It shows that 51 per cent. of the deaths had fits before labour, 32 per cent. during and 16 per cent. after, whilst of the recoveries 54 per cent. had fits before labour, 26 per cent. during and 20 per cent. after, figures which pretty well tally with what one expects.

Under the headings "Degree of Coma," "Albumen," "Blood Pressure," "Pulse," and "Temperature," the numbers in square brackets indicate the actual number of cases; the figures in ordinary brackets are the percentages of deaths and recoveries

in that class and should be read horizontally, whilst the figures without brackets are the percentages of deaths and recoveries respectively out of the total number of deaths and recoveries and should be read vertically.

Here there is the difficulty that different individuals have different ideas as to what "deep coma" really is as distinct from "coma," but we have taken the notes as they have been jotted down by the residents and we find that 47 per cent. of those who had deep coma died, while only 14 per cent. of those who were classed as comatose died, and none who were merely drowsy and restless, so presumably the depth of the coma is the co-efficient of the degree of toxæmia.

Similarly with the amount of albumen we have included totals and percentages and we find that where the urine was solid on boiling 28·5 per cent. died; here also the toxic effect on the kidneys as evidenced by the amount of albumen seems to help as regards prognosis.

We have in addition worked out the incidence in a rather arbitrary way with regard to grains per ounce.

In most cases this is definitely stated, and where the term loaded is used we have put it at 10 grs. There were 4 cases of 1 gr. or less albumen to the ounce and all recovered. Up to and including 10 grs. to the ounce there were 45 cases of whom 8 were fatal—a mortality of 17·7 and 70 cases of over 10 grs. with 20 deaths—a mortality of 28·5 per cent.

In connection with prognosis the total amount of urine passed has always been regarded as an important factor. There is the obvious difficulty here that the line of treatment by purgation entails the passing of urine when the bowels move, which makes the total amount passed in twenty-four hours a matter of guesswork and not a definite number of ounces.

Since the paper read by Dr Haultain to our Society in 1913 on the effect of veratrone more attention has been given to the question of blood-pressure, but we were surprised at the number of cases where the blood-pressure was below 140. Out of 16 such cases 4 died, a mortality of 25 per cent.; between 140 and 200, 81 cases of whom 15 died, giving a percentage of 19·7 per cent., whilst over 200 there were 17 cases of whom 6 died, a mortality of 35 per cent. If, as we believe, the usual percussion cap of an eclamptic explosion is the height of the blood-pressure one would expect that the mortality would be highest in those cases over 200, the fits more frequent and the

toxæmia more severe. This in the statistics appears to be so. The same is shown by the condition of the pulse. In only 10 cases was the pulse below 90, of whom 1 died; in 46 cases the pulse was between 90 and 120 and 12 of those died; a pulse of over 120 was noted in 20 cases of whom 6 died. Pretty much the same holds for the temperature. Below 100°, 7 died out of 42; between 100° and 103° 7 died out of 25, whereas a temperature of over 103° was only noted in 2 cases, both of whom died.

Causes of Death.—The total maternal mortality was 25 per cent. While in many cases death could definitely be ascribed to a profound toxæmia, to broncho-pneumonia, or to cardiac failure or shock or collapse; the fatal issue was frequently contributed to by a number of complications making an accurate analysis of the causes of death difficult. We have, however, more or less arbitrarily classified these causes under the headings of toxæmia, collapse, pulmonary and cerebral. Thus out of a total of 41 cases in 17, or 41·3 per cent., death was due to toxæmia. Under the heading collapse (which includes shock, heart failure, etc., and is restricted to cases dying within an hour or so of delivery) there are 9 cases, a percentage of 21·9. Pulmonary complications, usually broncho-pneumonia, claimed 8 victims (19·5 per cent.). In only one case (2·4 per cent.) did a brain lesion (acute cerebral œdema) seem responsible for death, and in the remainder of 6 cases (14·6 per cent.) the cause of death was impossible to ascertain; these last should probably come under the heading toxæmia.

Before passing on to the treatment one might mention that 3 cases were admitted suffering from a second attack and recovered, and in each case it was only the second pregnancy. In one there is a definite note to say that there was no evidence of nephritis when the patient left hospital completely recovered.

We must all have seen cases where the eclamptic condition seemed severe whilst the fœtal heart was audible and the movements palpable and where sudden cessation of the convulsions has taken place, and on listening one has discovered no signs of fœtal heart and all movements have ceased as if the death of the child had diminished the tendency to fits in the mother. These cases probably do not prove anything in the way of causation, but clinically they are interesting and possibly of value in prognosis.

Because of this we went more fully into the cases where

there was maceration of the fœtus showing death of the child some little time before delivery. There were in all 12 such cases of whom 3 died. Two of these deaths were caused by collapse immediately after delivery, and in the third the symptoms had cleared up when death occurred from broncho-pneumonia. What is striking, however, is that in ten of these cases the fits were purely ante-partum, in one before and during labour, and in one before, during, and after labour. The last mentioned had 14 fits in all and evidently was severely poisoned. She was one of the cases mentioned as collapsing after delivery. In the second case—where there were fits before and during labour—there were only 4 fits, and again the patient collapsed after delivery. In the third death the patient had had 16 fits, and was improving when broncho-pneumonia supervened.

Amongst the unusual cases was one patient, aged 19, a primigravidæ at term who had 7 fits during labour and 1 after, who was œdematous, comatose, pulse rate 136 and a temperature of 102°, who had complained of vision trouble on admission, but nothing abnormal was to be seen in the fundus. As the eyesight did not improve during the puerperium the eyes were again examined and it was found that there was definite separation of the retina in both eyes. The patient was discharged with complete absence of albumen, but her eyesight, although slightly better, was permanently impaired. This is the only case of permanent damage to the retina of which there is any note, but there were several cases of almost complete blindness lasting from twenty-four to forty-eight hours, where presumably the cause was a pressure œdema of the optic nerves. The rapid disappearance of the œdema entailed no permanent damage and the eyesight speedily became normal.

Another case worth quoting is that of a patient who suffered from very intense epigastric pain; so severe was this that she was admitted to a surgical ward in the Infirmary, and had a laparotomy performed for its relief at the seventh month of her pregnancy. Nothing abnormal was discovered, and as labour followed a fortnight later she was sent to the Maternity Hospital, where she developed one fit after delivery of the child.

One patient in her fifth pregnancy with a previous history of epilepsy was admitted during labour and had 2 fits with one fit after labour. The blood-pressure was 160, there was œdema and a pulse of 85, a temperature of 98°, but deep coma and the

urine solid on boiling. There were 2 grains to the ounce of albumen when discharged a fortnight later, so that we are in doubt as to whether this was a pure eclampsia or a mixture of eclampsia and Bright's disease. She is, however, the only patient who became insane, being discharged to the asylum. Another patient suffered from mental instability for ten days after an undoubted attack of eclampsia in her first pregnancy, but on discharge had completely recovered her sanity.

The latest day after delivery on which we find a patient developing eclampsia was the fifth day of the puerperium.

As regards treatment one is met with the difficulty that knowing nothing as to the exact causation of the disease treatment is largely experimental, a case of try anything and everything, with the result that one gets no series of cases treated with only one drug and no other lines of treatment medical or surgical. In practically every case the routine treatment of purge, hot baths and washing out the stomach has been followed, with occasional venesection. In all there were 35 cases in which that was the treatment with the addition of, in some cases, forceps or induction, and out of that 35, 10 or 28·5 per cent. died. Where morphia was the only drug used in addition to these remedies there were 36 cases of whom 9 died, a mortality of 25 per cent. In 36 cases veratrone alone was used similarly to morphia, and of those 8 died, and of those 8 deaths one died undelivered, one died after vaginal hysterotomy, and two of septic broncho-pneumonia, so that we feel that this death-rate is higher than it should be in treatment of eclampsia by veratrum. In 26 cases morphia and veratrone were both used and of those 5 died; of the deaths one died of broncho-pneumonia, having had 26 fits, and one was a severe post-partum case with 17 fits.

Whether in the light of increased numbers, such as we hope for from the combined statistics of the different hospitals, one can arrive at a more definite conclusion as to the value of medical remedies in this condition we do not know, but we feel that, apart from being a temporary sedative and a slight depressant to the blood-pressure, morphia is of little value and may be positively dangerous. One makes this statement with some trepidation considering the wonderful results obtained by its use in the Moscow and Dublin Schools.

A very common method of treatment is venesection, but in our hospital it has not been sufficiently made use of to warrant

any dogmatic statement, but if, as we imagine, its sole value is in reduction of blood-pressure we would prefer to use veratrone. It is alleged that one is removing poisoned toxic blood, but the amount that is drawn off in proportion to the total blood of the body seems to me so small as to be of no value whatsoever.

The obstetric treatment if there was opportunity and time was induction of labour. There were 72 cases in which there was definite interference and of those 16 died, a mortality of 22 per cent. This operative delivery consisted of 44 cases of forceps only—if one may term such an operative procedure. In 5 cases there was dilatation and forceps, in 2 cases version, in 7 induction, in 6 craniotomy, which in some of the cases was done as the pelvis was contracted, and in others because the child was already dead and a rapid delivery was desired. There were 6 cases of vaginal hysterotomy, and of those 6 cases 4 died. In one there are no notes to say as to what the condition of the patient was, except that she had 5 fits during labour and it was her third confinement. In another of the deaths the patient had had 18 fits, was deeply comatose and died 24 hours later. In another the patient had had 4 fits during labour, a blood-pressure of 190, deeply comatose, urine solid with albumen and she never rallied after delivery, both being ascribed to toxæmia. The fourth was also a severely toxic case, having had in all 26 fits, a blood-pressure of 190, deeply comatose, and died shortly after delivery. The post-mortem showed marked toxic changes in the liver, kidneys, and brain. Of the two who recovered one had 5 fits, a blood-pressure of 160, was slightly comatose with 12 ozs. of urine in the bladder on admission, so that one could see that she was probably less toxic than the others, and she recovered; but the other recovery was in a woman who had had 30 fits, with a blood-pressure of 170, was deeply comatose, and otherwise showed signs of severe poisoning.

From the small number of cases one cannot deduce anything either in favour of or against this method of treatment. The fact that so many died is more an indication that the operator considered the patient to be so severely poisoned that immediate and rapid delivery was the first essential, and as one would expect in such severe cases, the death rate is naturally high.

The classic Cæsarean section was performed in only 2 cases, one of them for contracted pelvis where the woman had had only 2 fits and was admitted during labour so that the

treatment was not directed specially to the complication but more to the obstetric application. The other case was admitted, having suffered from what are described as numerous fits before admission, and she had 4 in hospital after admission, a blood-pressure of 160, pulse and temperature of 112 and 102° F. respectively, deeply comatose with urine loaded with albumen, and because she was a youthful primipara and considered unlikely to improve under ordinary medical treatment Cæsarean section was performed. The child was dead. On the day following the operation the symptoms were just as severe except that there were no fits and she had become semi-conscious and could not answer any questions. Within twenty-four hours she became completely unconscious and died. Pulmonary œdema was a prominent feature.

In connection with the infants there were 45 premature, of whom 36 were still-born, 1 died and 8 survived. Of the full-time children 71 were still-born and 91 were born alive, of whom 80 survived. This gives us a fœtal mortality of 43·8 per cent. and an infantile death rate in the first ten days of 7·7 per cent.

Discussion.

Dr Ballantyne spoke as to prognosis from the height of the blood-pressure, for the rising of the pressure to a certain height brought with it in many clinics the performance of venesection. In his department (the antenatal) this operation was routine treatment when the pressure rose to 180. Thus one could not draw conclusions from this clinical manifestation without having check cases in which venesection was not performed. He also thought that the subdivisions as to methods of treatment might be misleading. There should be a group in which medical treatment alone was employed. The use of forceps when the head was on the perineum was hardly instrumental interference in the ordinary sense of the word. He did not wish to appear to be diminishing the value of this elaborate and well-worked-out analysis, he was only showing how fallacies might arise from depending too greatly upon the statistics in it. When statistics from Dublin, Liverpool, Glasgow, and other places were placed side by side valuable conclusions might be reached.

Dr Johnstone said that one point had emerged with great clearness from this statistical analysis, namely, the necessity of having a Registrar on the staff of the Maternity Hospital. If there were a regular system of analysing cases at the time of their admission, and a Registrar to

collate the information from week to week or from month to month, a great deal more information would have been available and more easily dealt with. He hoped that this matter would be put right very soon. The need for the appointment of a clinical pathologist also emerged from the consideration of these cases—one who would undertake the examination of the urine in a more systematic, accurate, and elaborate way. A great deal more information ought to have been forthcoming with regard to the condition of the urine, which, in view of such work as that of Mackenzie Wallis, might ultimately prove of value in diagnosis and prognosis.

Dr Johnstone asked if Dr Davidson and Dr Miller had been able to determine the absolute incidence of eclampsia for these ten years. Secondly, with regard to the post-partum cases, he recalled that Sir Halliday Croom always maintained that these were the most fatal of all. In 1910 Dr Johnstone had made an investigation into the literature on this subject, and he came to the conclusion, which had not been noted before, that the prognosis depended upon the length of time after the delivery at which the fits began. In most cases they originated within twelve or twenty-four hours after delivery, and the mortality amongst these cases was low. On the other hand, some cases began more than forty-eight hours after delivery, and the prognosis in such cases was uniformly bad. He believed that this, to a great extent, explained the considerable discrepancy in the views which were taken by different observers of the prognosis of post-partum eclampsia. He considered that if this report was typical of those which were going to be presented by the other Societies at the Liverpool Congress, that meeting would be a very fruitful one.

Dr Haig Ferguson said he considered these statistics extremely valuable. They had, however, to be minutely gone over along with Dr Davidson's paper before all the points brought out could be satisfactorily grasped, and the paper would need to be read carefully through, before adequate criticism could be made. By many authorities post-partum eclampsia was regarded as the most fatal form of eclampsia. He had quite the opposite experience. He had met with no deaths from post-partum eclampsia where the fits came on for the first time in the puerperium. Of course where the fits continued on into the third stage from the intra-partum variety, that was a different matter. The Society was greatly indebted to Dr Davidson and Dr Miller for all the trouble they had taken in preparing this valuable paper. He was quite aware that the data from which they had drawn their statistics were in many instances unsatisfactory from a statistical point of view, and he strongly urged that a better system should be instituted whereby the valuable records of the Maternity Hospital cases would be made available and useful. He thought that they as teachers should take

up the matter more seriously than had been done in the past. Dr Davidson's paper had brought out that many of the cases had not been fully and systematically recorded, and that much valuable information was lost on account of this. He hoped that steps would be taken to remedy this state of matters for their successors.

Dr Barbour congratulated the writers on the patience and courage which they have shown in carrying through their inquiry. In trying to work up a similar investigation his courage failed, and he could not carry it through because the records were so often unsatisfactory. He would like to ask a question, with regard to the condition of the fœtus. He understood that in cases where the patients had died before delivery took place, the prognosis had been more favourable. It was interesting to note the effect that the death of the fœtus had on toxæmia. He was quite sure that the point to which Dr Johnstone referred as to the appointment of a Registrar to the Maternity Hospital would be of great assistance. He supposed that something more than a Registrar would be wanted. They would require to supervise the taking of records, and give continuity in the matter of taking them which would not be got with the constant change of residents.

Dr Oliphant Nicholson said that he considered the sudden interruption of the secretion of urine—anuria—the most important question for study in eclampsia. Observation of the amount of urine secreted, together with a rising urea output, formed the best index for prognosis; if anuria persisted the patient died. He did not regard a very large amount of albumen in the urine as invariably a bad thing; in his view the particular alteration in the renal circulation which caused the anuria would be likely in most cases to give rise to a urine loaded with albumen at some stage of the illness. In the hospital cases of eclampsia, information as regards the quantity of urine (before admittance) was often difficult to obtain, but some idea of the amount secreted under treatment would form an interesting additional heading in Dr Davidson's excellent analysis.

Dr Fordyce thought that the material from which the report had been made must be open to criticism, as long as several men are not working along the same lines of investigation. He agreed with Dr Nicholson that the degree of anuria was more important than the amount of albumen, and thought that if the death-rate had been correlated to the secretion of urine the report would have been more valuable. Then he considered they might have gone into more detail as regards treatment. His experience had been that in cases of eclampsia, the less that was done the better the patient seemed to do; it was seldom that private patients died of eclampsia, but in hospital where patients were bled and flooded with fluid, and labour induced,

the death-rate seemed to be very high. He considered that the copious injections of saline into the veins or subcutaneous tissues led to acute œdema of the lungs, and the death was often put down to pneumonia. The results when the patient was allowed to deliver herself without interference might have been elaborated.

Dr Keppie Paterson suggested an alternative or temporary measure pending the appointment of a Registrar at the Maternity Hospital. The staff could meet together now and then and arrange for organised or team work. At present each was interested in a different section in his own quarter. It would be of great value if they sketched out schemes for collective scientific investigation, not only on eclampsia, but also on other subjects.

Dr J. L. Green asked if any special record had been made of cases under previous medical supervision, and those admitted in a state of eclampsia without any previous attention. The fear of eclampsia made the general practitioner watch his patients from the time he first saw them, therefore eclampsia was comparatively rare in private practice. In this connection, what had been the effect of Maternity Welfare Cliniques on the number of cases? Had the effects of lumbar puncture ever been tried, and had the urine been examined for the presence of acetone.

Dr Porter thought the paper would be more valuable if the age of the patient was stated, also the state of the vessels, and if possible the previous history.

The President remarked that they had had an interesting discussion on this serious complication of pregnancy and labour. The causation of the disease did not come within the scope of the paper, but one could not help referring to the extraordinary divergence of opinion as to the cause. Dr Lackie had noticed that the latest theory was that the pre-eclamptic symptoms were due to over-activity of the anterior pituitary lobe and the actual eclamptic symptoms to over-activity of the posterior pituitary lobe. Then an old theory had lately been revived that eclampsia was due to increased abdominal pressure, which, as far as he could see, had nothing to support it. Hastings Tweedy alone was perfectly happy about eclampsia and its cause and treatment. It was due to intestinal toxæmia, and by emptying the intestinal canal and feeding the patient for several days on nothing but water, he got the best results. Then there was Dr Young's theory that it was due to thrombosis and necrosis of the placenta, and this theory had much to commend it.

Regarding treatment, the President said that he pinned his faith to veratrum viride. He was convinced that the actual seizure was due to increased blood-pressure, and no drug lowered the blood-pressure like

veratrone. In recommending the use of veratrone, Dr Lackie emphasised the importance of giving this drug in small doses—only half a c.c. at a time. It had a powerful depressant action on the heart and on the nervous system, and he was convinced that half a c.c. was sufficient in any case. He had seen two cases that had died immediately after getting an injection of 1 c.c. Morphia he did not like. It stopped elimination. Certainly it was useful in some conditions, *e.g.*, if the patient had to be moved by ambulance from country to town.

Venesection lowered the blood-pressure and removed some of the toxin. He would not recommend it for anæmic or emaciated women, but where the patient was well nourished and plethoric it often did great good.

PRIVATE BUSINESS.

Meeting—14th June 1922.

The following were elected ordinary Fellows of the Society: J. B. de Winton Maloney, O.B.E., F.R.C.S. Ed., and Abundius Joseph d'Abreu, M.B., B.S. Bombay.

INDEX

ABORTION, Incomplete Tubal, Specimens of Secondary Abdominal Pregnancy following (E. F. Murray), 108

Accounts, Statement of, xx

Adeno-carcinoma and Squamous Epithelioma of Uterus, Case of Combined (J. Lamond Lackie), 44

BROWNE, F. J., Fœtal Ovary, Specimen of, 58

Business, Private, 19, 44, 59, 85, 109

CÆSAREAN Section and Alternative Treatment (J. Lamond Lackie), 61

Cæsarean Section in Multiple Pregnancy (Wm. Fordyce), 41

Cancerous Growths, Further Study of an Organism obtained in (J. Young), 110

Chorion Epithelioma of the Uterus, Specimen of (R. G. M'Kerron), 103

Craig, Wm., Obituary Notice of, 59

Cyst, Ovarian, Two Cases of (R. W. Johnstone), 44

DAVIDSON, Hugh S., Case of Ovarian Dermoid Rupturing into the Bowel during Labour, 54

Cervical Fibroid, Specimen of, 44

Fibroma of Ovary, Specimen of, 58

Davidson, H. S., and Douglas Miller, Record of Eclampsia in the Royal Maternity Hospital, Edinburgh, during Ten Years, 1912-1921, 121

Dermoid, Ovarian, Rupturing into the Bowel during Labour (H. S. Davidson), 54

Discussions, 30, 50, 57, 80, 95, 102, 119, 130

Disproportion, the Induction of Premature Labour in Cases of (H. O. Nicholson), 73

ECLAMPSIA, Record of, in the Royal Maternity Hospital, Edinburgh, during Ten Years, 1912-1921 (H. S. Davidson and D. Miller), 121

Election of Fellows, 44, 60, 85, 109, 134

Epithelioma, Adeno-carcinoma and Squamous of Uterus (J. Lamond Lackie), 44

Chorion-, of the Uterus, Specimen of (R. G. M'Kerron), 103

Exhibition of Specimens, 44, 58, 85, 103

FERGUSON, James Haig, Inversion of the Uterus, with a Record of Four Cases, 33

Fibroid, Cervical, Specimen of (H. S. Davidson), 44

Uterine, Case of (G. Herzfeld), 44

Fibroma of the Ovary, Specimen of (H. S. Davidson), 58

Fœtal Ovary, Specimen of (F. J. Browne), 58

Fordyce, Wm., A Case of Cæsarean Section in Multiple Pregnancy, 41

Valedictory Address, 1

GYNÆCOLOGICAL Diagnosis, Pneumoperitoneum of the Pelvis as an Aid to (R. Lance Impey), 21

HERZFELD, Gertrude, Menorrhagia of Puberty, Case of, 44

Uterine Fibroid, Case of, 44

ICTERUS Neonatorum (E. F. Murray), 86

Impey, R. Lance, Pneumoperitoneum of the Pelvis as an Aid to Gynæcological Diagnosis, 21

Inversion of the Uterus (Haig Ferguson), 33

JOHNSTONE, R. W., Ovarian Cyst, Two Cases of, 44

Uterus Didelphys, Specimen of, 85

LABOUR, Case of Ovarian Dermoid Rupturing into the Bowel during (H. S. Davidson), 54

Index

Labour, The Induction of Premature, in Cases of Disproportion (H. O. Nicholson), 73
Lackie, J. Lamond, Adeno-carcinoma and Squamous Epithelioma, Case of, 44
Cæsarean Section and Alternative Treatment, 61
Degenerating Placental Tissue, Case of, 44

M'Kerron, R. G., Specimen of Chorion Epithelioma of the Uterus, 103
Menorrhagia of Puberty, Case of (G. Herzfeld), 44
Miller, Douglas, Omphalorrhagia, with a Record of Two Cases, 97
See also Davidson, H. S.
Multiple Pregnancy, A Case of Cæsarean Section in (Wm. Fordyce), 41
Murray, E. Farquhar, Icterus Neonatorum, 86
Specimens of Secondary Abdominal Pregnancy following Incomplete Tubal Abortion, 108

Nicholson, H. Oliphant, The Induction of Premature Labour in Cases of Disproportion, 73

Obituary, Dr William Craig, 59
Omphalorrhagia, with a Record of Two Cases (D. Miller), 97
Ovarian Cyst, Two Cases of (R. W. Johnstone), 44
Ovarian Dermoid Rupturing into the Bowel during Labour (H. S. Davidson), 54
Ovary, Specimen of Fibroma of the (H. S. Davidson), 58
Specimen of Fœtal (F. J. Browne), 59

Pelvis, Pneumoperitoneum of the, as an Aid to Gynæcological Diagnosis (R. Lance Impey), 21
Peritonitis, Acute Tubal, Diagnosis and Treatment of (J. W. Struthers), 45
Placental Tissue, Case of Degenerating (J. Lamond Lackie), 44
Pneumoperitoneum of the Pelvis as an Aid to Gynæcological Diagnosis (R. Lance Impey), 21
Pregnancy, Multiple, A Case of Cæsarean Section in (Wm. Fordyce), 41
Specimens of Secondary Abdominal, following Incomplete Tubal Abortion (E. F. Murray), 108
Premature Labour, The Induction of, in Cases of Disproportion (H. O. Nicholson), 73

Sarcoma of the Uterus, Specimens of Round-celled (J. Young), 59
Specimens, Exhibition of, 44, 58, 85, 103
Struthers, J. W., Diagnosis and Treatment of Acute Tubal Peritonitis, 45

Tubal Abortion, Incomplete, Secondary Abdominal Pregnancy following (E. F. Murray), 108
Peritonitis, Acute, Diagnosis and Treatment of (J. W. Struthers), 45

Uterine Fibroid, Case of (G. Herzfeld), 44
Uterus Didelphys, Specimen of (R. W. Johnstone), 85
Epithelioma, Combined Adeno-carcinoma and Squamous, of, 44
Inversion of (Haig Ferguson), 33
Specimen of Chorion Epithelioma of (R. G. M'Kerron), 103
Specimens of Round-celled Sarcoma of (J. Young), 59

Valedictory Address (Wm. Fordyce), 1

Young, James, Further Study of an Organism obtained from Cancerous Growths, 110
Round-celled Sarcoma of the Uterus, Specimens of, 59

PRINTED BY OLIVER AND BOYD, EDINBURGH, SCOTLAND

SERIAL

P
Med
E
v.42

GERSTS

Edinburgh Obstetrical Society
Transactions